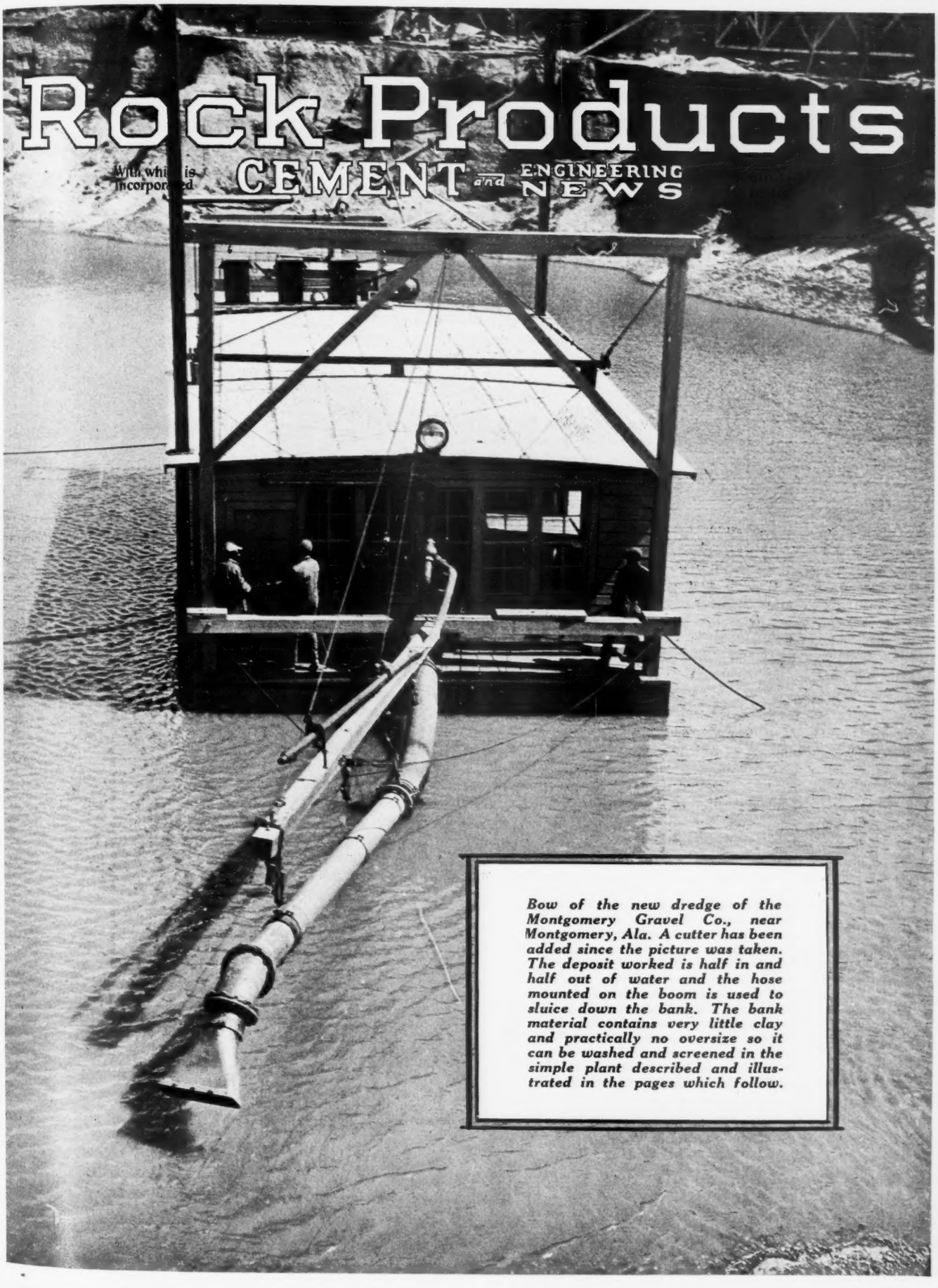
Volume XXX Chicago, September 3, 1927 No. 18

# Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS



*Bow of the new dredge of the Montgomery Gravel Co., near Montgomery, Ala. A cutter has been added since the picture was taken. The deposit worked is half in and half out of water and the hose mounted on the boom is used to sluice down the bank. The bank material contains very little clay and practically no oversize so it can be washed and screened in the simple plant described and illustrated in the pages which follow.*

# Gravel Plant Which Varies From Usual Lines

## Montgomery Gravel Co. Has No Scrubbers, Rotary Screens or Automatic Sand Tanks at Its Newest Operation

*Washing and screening plant of the Montgomery Gravel Co., near Montgomery, Ala.*

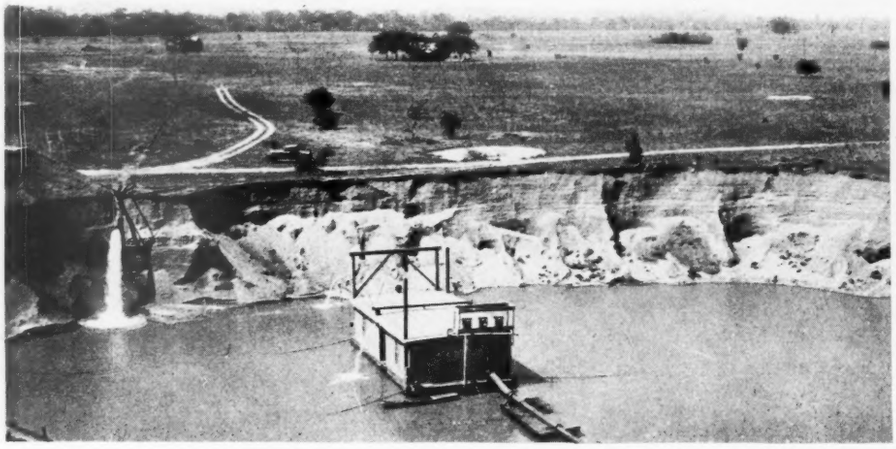
THE Montgomery Gravel Co. of Montgomery, Ala., a subsidiary of the Birmingham Slag Co., began producing in the latter part of 1923. It first built a plant at Arrowhead, 13 miles out of Montgomery, which was one of the best in the south. It was described in ROCK PRODUCTS, May 13, 1925. Electric shovels were used to dig the bank material, storage battery locomotives brought it from the field and it was washed in a plant of a standard type, that is, having rotary screens of standard make with automatic discharge sand settlers, supported on bins of sufficient capacity to provide storage for nearly a day's run.

This is the type of plant which experience has shown to be best adapted to large scale production in the glaciated area of the United States, where the greater part of the sand and gravel is produced, and it is to be found in that area everywhere, with such changes in detail as the use of machines of different manufacture dictates. Outside of the glaciated area of the country there are many such plants operating on river gravels and the gravels from the clayey deposits found on the edge of the coastal plain. It is, in a word, the standard plant found in every important gravel producing district with a very few exceptions.

This being the case, the new plant of the Montgomery Gravel Co. is a somewhat surprising departure from the conventional form which was embodied in its first plant. There are no provisions for scrubbing, no rotary screens, no automatic sand settlers and no bins to hold more storage than is necessary to permit cars to be changed without spilling any material on the ground. Yet it is a highly efficient plant, of ample capacity to handle all the bank material that is sent to it and it functions steadily and smoothly every working day of the year.

This plant was built in the latter part of 1926 and the early part of 1927. It was designed by J. C. Bible, who came to the Montgomery company after several years with the Alabama Sand and Gravel Co., the oldest producers in the Montgomery field. Mr. Bible has a knowledge of the sand and gravel business equaled by that of few men in the United States, for he was born into it. His father, H. L. Bible, who died in 1925, was one of the pioneer producers of the country and the son played on his father's sand dredges at Chattanooga when he was a small boy. Later he received a technical education and was associated with his father in designing and building plants. For a time he had charge of production for the New England Gravel Co., one of the large companies operating near Boston. Afterward he visited most of the important plants on the Atlantic coast, and many in the Middle West, to study methods of working.

With this background he was able to appreciate that the sand and gravel of the Montgomery district can be washed and screened with the simplest sort of plant and equipment. There is very little clay in the deposit and the shallow overburden is almost all fine sand. Such clay as exists is not of the kind that forms clay balls or hard films on the surface of the pebbles. Hence there is no need of scrubbing. There is not a great deal of the small sized pebbles that clog a sand screen and make the separation of sand from gravel difficult, so a gravity screen is sufficient for preliminary screening. Vibrating screens are used in the next step to complete the work of the gravity screens and make the separation of the sizes of gravel. The screen products fall into



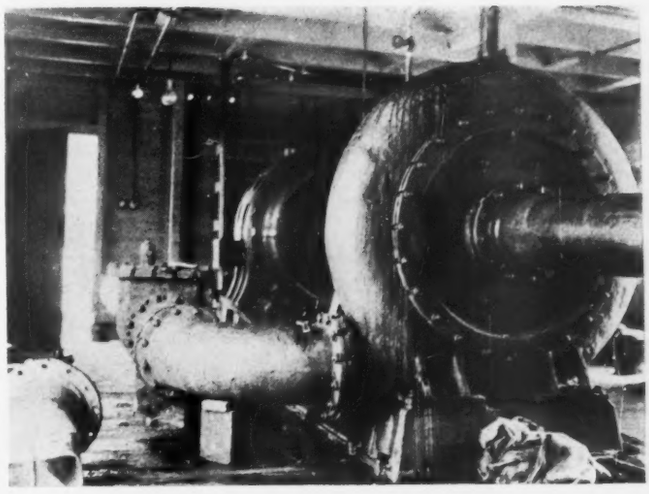
*The dredge pond from the plant, showing the great extent of the unworked deposit*

small bins, just sufficient to permit changing cars, for this district has been fortunate enough not to suffer car shortages and cars are always available for loading or for transferring to storage. For this latter purpose the plant has its own cars and locomotives. Crushers were omitted, for there is so little oversize in this field that a crusher is not justified even in plants of the largest output.

Before beginning operations the 580 acres of the deposit that had been purchased were very thoroughly prospected. The ground was laid off in squares, 300 ft. each way, and test pits were sunk at the corners. Samples were taken representing definite footages from the bottom to the top and each sample was screened to commercial sizes and the amount of each size recorded. The whole was plotted and figured by weighted averages so that the recovery to be expected was pretty accurately known before it was decided to begin operations.

***Joint used on pipe line to river***

Among other things the ground water level was carefully determined to see if the deposit should be worked by a dredge, dragline or steam shovel. As the deposit was found to go about 18 ft. below the ordinary ground water level it was decided to build a dredge. The dredge building was the first work undertaken, somewhat to the amusement of the passers-by who wondered why a boat was being built out in the middle of a big field and nearly a mile from the river.



***Pump and direct-connected motor on dredge***

Since there was no water for 27 ft. below the dredge, water had to be supplied at the start. A 12-in. pipe line, 4000 ft. long, of Naylor spiral lap-seam pipe was laid in the river and an Allis-Chalmers 10-in. centrifugal pump, direct-connected to a 150-hp. motor, was installed. The only cost of the pipe line was that of laying it and taking it up again, plus the interest on the investment, for all of the pipe will be used on the dredge discharge line in future operations, the wear from pumping clear water through it being almost negligible. A clamshell was used for excavating the lake sufficiently large enough to launch the dredge hull and then the dredging equipment installed upon it, after which the cabin was built. The material excavated was loaded in cars and used to ballast the tracks.

The dredge hull is 45 ft. long and 26 ft. wide and it carries pumps for both sluicing and pumping the material to the screens, as a number of dredges of later construction do. A cutter was not included in the design at first, for it was thought that a water jet cutting the ground below the suction bonnet would loosen the ground as much as was necessary. Later it was judged a cutter would give a higher percentage of solids and one was designed for the dredge by W. H. K. Bennett, which is being installed at the present time.

The hull is built of timber and thoroughly braced and stiffened by longitudinal bulkheads. Timber construction is cheaper than it is in northern states, where a steel hull can often be built at a lower cost than a wooden hull. The cabin covers practically all the hull, a space only 3 ft. wide being left uncovered at either end. There are two spuds, each a 10x10 timber 40 ft. long. These are furnished with steel points but are not armed with angle irons on the corners, as is the practice with large spuds. The spud wells are made by bolting two pieces of 10x10 timber to the hull, and bolting strap irons across, so that the spud can slide between them. One of these wells shows at the stern of the dredge in one of the pictures. Since the deposit extends only 18 ft. below water level, there is no need of a suction longer than 27 ft. and this is supported by a boom and braced square frame of simple construction. The sluicing pipe and nozzle is carried on the boom.

***The high percentage in gravel of this deposit shows plainly where the bank has slipped***

The main pump has a 12-in. discharge and suction, and is of the heavy duty type with long thrust bearings. It was made by the American Manganese Steel Co. It is direct-connected to a 400-hp. slip-ring, variable speed Allis-Chalmers motor. Automatic contactors are not used, the speed being built up by a Cutler-Hammer controller.

water into the suction and pump. The injector is placed above the pump and the discharge from it goes out over the side of the dredge. Since this method of priming demands that the discharge pipe be closed, a Bennett manganese steel flap valve is placed in the discharge pipe. This opens automatically when pumping begins and closes

The suction is a plain wrought-iron pipe with a piece of Manhattan rubber hose to permit bending. The suction bonnet is without screen or bars, as there are no large stones, lumps of clay or roots to be kept out, and for the same reason the pump has no stone box. The discharge line at present is of standard 12-in. pipe, but spiral lap-seam pipe is to be used later. The line is carried on wooden pontoons, 6x18 ft. and 36 in. deep. Pipe joints are made with ordinary cast-iron flanges, but wrought iron flanges are being tried, as occasionally a cast flange has broken. Flexibility is provided for by

***Washing and screening plant seen from the pond side***

***The tower type of washing plant, 14 x 24 ft. and 38 ft. high, built of "cribbing"***

For sluicing there is an Allis-Chalmers centrifugal pump, with a 5-in. suction and 4-in. discharge, direct-connected to a 30-hp. motor. This pump also supplies water for the jet below the suction bonnet and for priming, and the priming is done by a method which is becoming common in the southern field. A 2-in. Penberthy injector is run with water in the place of steam and this produces a vacuum sufficient to draw

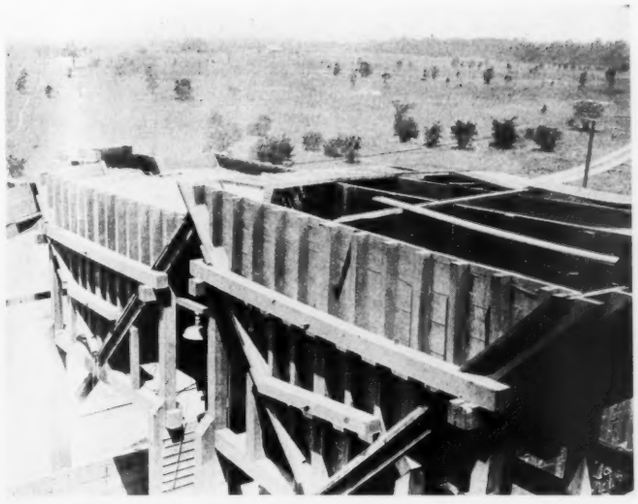
when pumping ceases, reading for priming.

For handling the suction, the lines and the spuds there is a three-drum hoist made by Street Bros. of Chattanooga, Tenn. There are no drums for the spud hoists but two cat-heads, around which a manila rope is thrown for a couple of turns when it is desired to raise a spud, the line being unwound and made fast when the spud is raised.

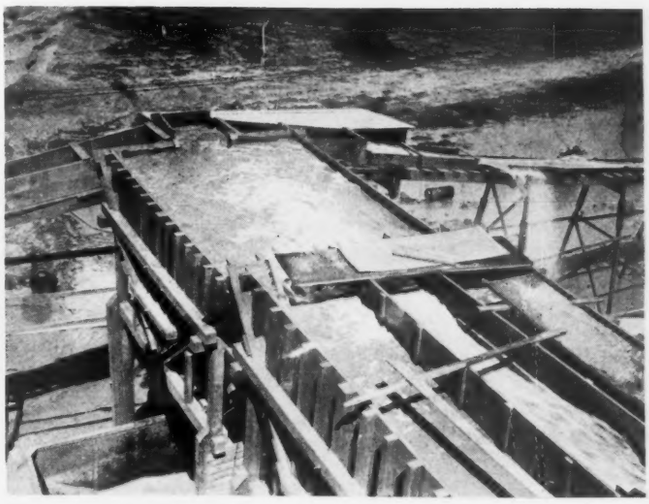
hose connections at both ends of the pontoon line.

At present the dredge is working as far as 350 ft. from the plant and elevating the

***The dredge has a short suction as the deposit extends only 18 ft. below water. Note the sluicing nozzle which is carried on the suction boom***



*Side of sand settling tanks, showing their construction*



*Top of settling tanks. Note baffles in coarse sand tank*

discharge about 60 ft. It is not planned to increase the working distance beyond 500 ft. As soon as that distance has been reached a booster pump will be installed, for it is the company's belief that boosting is less expensive than pumping through a longer line.

The washing plant is unique among plants used with dredges, although it somewhat suggests the tower type of plants used with cableway excavation. The main feature is a tower 24x14 ft. and 38 ft. high, which is built of cribbing on concrete foundations. This was found to be the cheapest construction for the material and labor available. On top is a fanning table 4 ft. wide at one end and 14 ft. wide at the other. The pump discharge comes on to this table through a right angle bend and spreads out evenly before reaching the discharge end. It falls from the fanning table on a 14x6-ft. gravity screen set at 45 deg. and leaning away from the flow. This screen is of heavy wire, with ⅜-in. square meshes carried in a light steel frame so that it can easily be changed. It gives very little trouble from clogging. The oversize of this screen goes to two double-deck Link-Belt vibrating screens. These are supplied with sprays to wash off any adhering undersize. The upper two of these screens take out sand and roofing gravel, the lower two make building gravel (1½-in. and finer) and paving aggregate (2½-in. and finer) as a regular thing. But the screens are changed to meet any demands for special sizes and grading. Roofing gravel is sold not only for the purpose implied by its name but for use as road covering on oil treated roads.

*An artesian well supplies water for locomotives and for domestic use*

There was no grizzly to take out oversize when the plant was visited, but a flanged lip screen, made by the Hendricks Manufacturing Co., was about to be installed for use as a grizzly. While the amount of oversize is small, there is enough of it to interfere with the grading of paving aggregate at times and the oversize product itself is salable at a premium over ordinary gravel.

The water and sand from the gravity screen, and the sand from the first vibrating screen, go to two sand tanks in series. Each is 16x18 ft. and there are partitions in the first tank to divide the flow evenly and break up eddy currents. These tanks act as simple surface current classifiers. The product of the first is concrete sand and of the second fine sand for masons' and plasterers' uses. The valves by which the sand is discharged are ordinary 3-in. pipe nipples which may be closed by a wooden flap on which a piece of belting is nailed. This is a rather crude arrangement which might be improved, as when the valve is partly closed it scatters sand and water badly.

The entire washing plant was built of Douglas fir and it took three carloads to build it. It should be mentioned that while the plant is simple, the construction throughout is of the best. It was put up to last the life of the deposit.

The waste from the plant, clay and fine and, is carried away to low land nearby at present. When the dredging pond is big enough so that the waste water can be discharged far enough from the dredge so that it will not contaminate the product, the waste will be sent back into the pond. Then the pumping of water from the river can be stopped.

All storage is piled on the ground a short distance from the plant and cars are loaded and unloaded by an Ohio locomotive crane.

The plant is four miles from a railroad and the company had to build a track from the road to the deposit. This has been substantially ballasted and laid with creosoted ties and 60-lb. rail. Two 40-ton American locomotives handle the cars through the plant and out to the main line. A Link-Belt car puller of the capstan type has been installed to move cars when no locomotive is available. Water for the locomotives and the crane and for drinking comes from an artesian well drilled in the deposit near the

*Only vibrating screens of this type are used for gravel screening*

plant. A 2-in. centrifugal pump sends the water to supply tanks and pipes.

Electric heating is used at the plant office and on the dredge. Used on the dredge, it was found especially economical from the lower insurance rates which were charged.

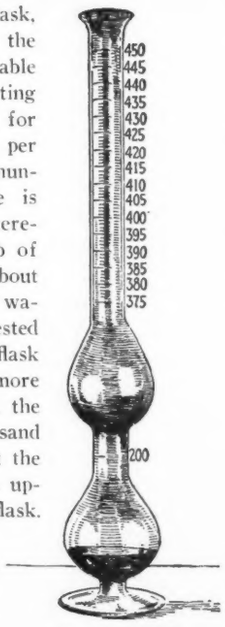
From an engineering point of view this would seem to be one of the noteworthy installations of the year. There is, first of all, the very thorough prospecting and study of the deposit before deciding to build at all. Next, the determination of the ground water level, 27 ft. below, which showed that a dredge was the best machine to use for excavating. And finally there was the recognition that the material needed only the simplest sort of a washing and screening plant and the departure from classic types in designing and building it. Everything was foreseen and everything has worked out as it was expected to. Even the capacity expected, 66 cars a day, which is the rated capacity of the pump working in loose material, has been maintained.

The main office of the company is in the Shepherd building, Montgomery, Ala. T. F. Wallace is the general manager and J. C. Bible is sales manager.

## Determining Sand Moisture and Density

THE method of Cloyd M. Chapman for determining the specific gravity and moisture content of sand, which was presented at the recent meeting of the American Society for Testing Materials, employs a special flask. This is graduated in such a way that by using a chart the moisture of a damp sand may be read at once. By weighing the flask and its contents the percentage of voids may be determined and by introducing a weighed quantity of dry sand the specific gravity may be determined. The following is from Mr. Chapman's own description of the method published in *Engineering-News Record:*

"The necessary equipment consists of scales, a special flask, such as is shown in the illustration, and suitable diagrams for interpreting results. The diagram for use in determining per cent of voids in innundated fine aggregate is shown in the chart herewith. The lower bulb of the flask is filled about three-fourths full of water. The sand to be tested is poured into the flask and if necessary more water is added until the level of both the sand and the water are at the 400-c.c. mark on the upper neck of the flask. The flask and contents are then weighed, the weight of the flask is deducted and by means of the chart the per cent of voids or the number of gallons of water per cubic foot of inundated sand is read directly from the chart.




***Special flask***

"If the specific gravity of the sand is to be determined, 500 grams of a surface dry sample are weighed out and introduced into the flask in which 200 c.c. of water have previously been placed. The combined volume of the sand and water is read on the upper neck of the flask. By the use of a chart furnished with the flask the approximate apparent specific gravity is determined without mathematical work.


***Chart for reading moistures***

"When the moisture of a damp sand is to be determined the procedure is to fill the flask to the 200-cc. mark on the lower neck, introduce 500 grams of the damp sand into the flask and read the combined volume of the sand and water on the upper neck of the flask. By the use of a chart somewhat similar to that shown herewith, either the per cent of moisture in the sand or the gallons of water in 100 lb. of the sand may be ready directly."

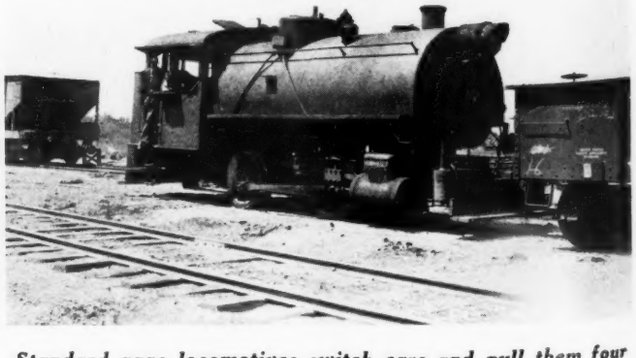
## Abrasive Products of Canada

TWO new bulletins, Part II on corundum and diamond and Part III on garnet, have just been brought out by the Department of Mines, Canada. Although these are separate bulletins, they belong to the series of publications concerning the uses, sources of supply, preparation and markets of the numerous minerals and materials included under the heading of "Abrasives."

The bulletin on corundum contains a considerable amount of information summarized from various reports and brought up to date. An account of the emery industry and a few notes on abrasive diamonds are also included, as well as a brief description of the principal deposits, production, and methods of treatment of the foreign material. The price of this bulletin is 15 cents.

Up to the present bulletin there has been little collected information on Canadian sources of supply of garnet. The brief references and descriptions appearing in numerous reports have been collected, sorted and brought up to date by local inquiries and field investigations and gathered into the bulletin, which also contains a brief description of the geology and occurrence of the principal deposits, production methods, uses, and the like. Copies of this bulletin are available at 20 cents each.

***All storage is carried in stock piles and loaded in and out by a locomotive crane***



***Standard gage locomotives switch cars and pull them four miles to the main line***

# New 7,000-Barrel Cement Mill at Buffalo

## Great Lakes Portland Cement Corporation's New Plant Quickly Reaches a High Rate of Production

By R. H. Rogers
Industrial Engineering Dept., General Electric Co., Schenectady, N. Y.

*The new plant of the Great Lakes Portland Cement Corp., which has a number of novel features, particularly in the application of electric power to the various parts of the operation*

THE starting up of a new cement plant is always of interest, and it is particularly so when many novel features are involved. The Great Lakes Portland Cement Corporation's mill at Buffalo has a number of unique characteristics which, taken with the fact that practically full production was reached in five weeks after power was turned on, makes it worthy of extended description.

### Location

The plant lies almost at the southern city line of Buffalo, with the harbor at the west; the Union Canal is along the south side and it faces the Hamburg Turnpike, the main thoroughfare to the west, on the east. Deep water on two sides, railroad connections, trolley rail connection and main highways afford exceptional shipping routes. This portion of the city is zoned for heavy manufacturing, near neighbors being the Lackawanna plant of the Bethlehem Steel Co. and the Rogers Brown Iron Co. Labor is plentiful within a reasonable distance and trolley service to the plant is abundant, but judging by the parked cars, most of the employes travel by automobile.

### Raw Materials

Crushed limestone is delivered in the yard by boat from quarries at Rogers City and Rockport, Mich. The cost compares favorably with that of normal cement mill quarry operations and, if an unfavorable differential exists, it is more than offset by the low cost of power in Buffalo. Shale is brought in by the Pennsylvania R. R. bottom-dump gondola cars from the cement corporation's quarry at Shaleton about 12 miles away. Coal and gypsum comes by rail in bottom-dump gondola cars.

A small, automatic, electric pump having a capacity of 750 g.p.m. elevates low pressure city water to a high tank for general service.

***THE editor recently had an opportunity to inspect and study the new plant of the Great Lakes Portland Cement Corporation at Buffalo, N. Y. It is undoubtedly one of the finest plants yet built.***

***Things about it of particular interest to other cement manufacturers are (1) its construction details, all structures with the exception of the kiln building being of reinforced concrete, the slip-form method of construction being employed throughout; (2) the method of getting the raw materials, including coal, to the mills, which was adopted because of the cramped space; (3) the finest electrical equipment of any industrial plant in America to date.***

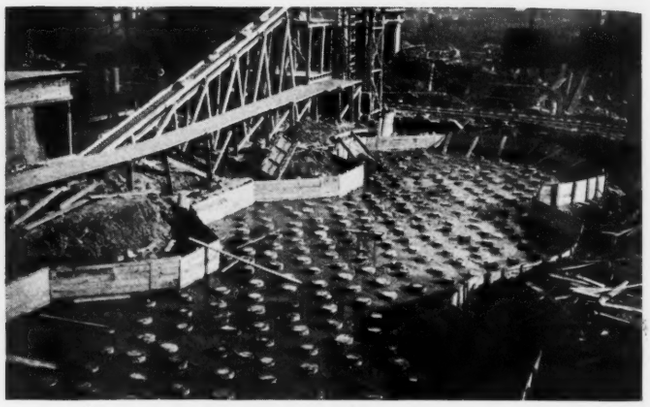
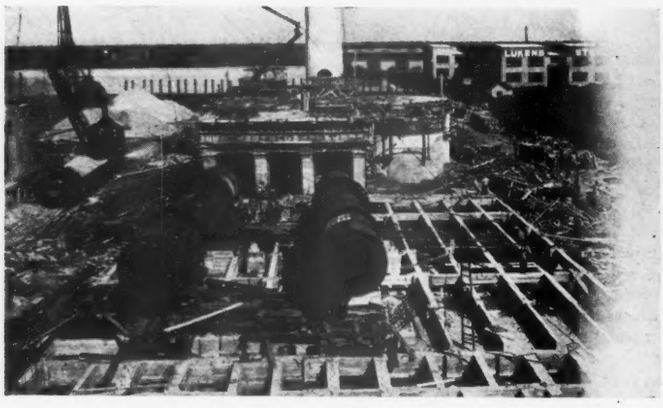
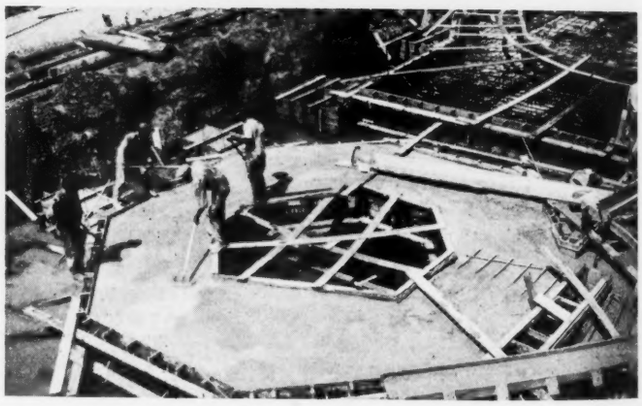
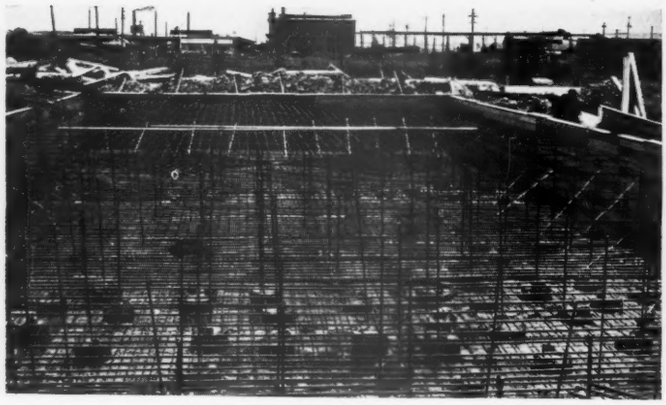
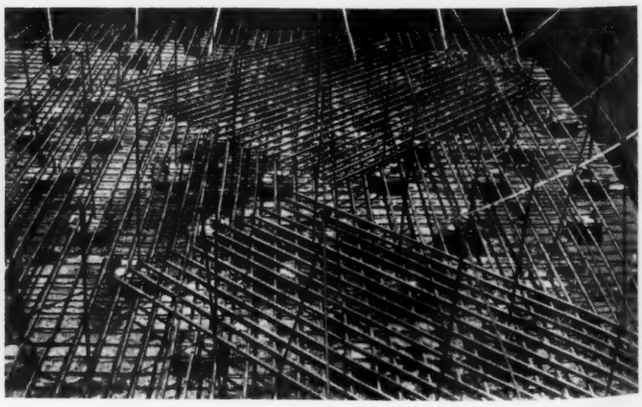
***It is undoubtedly this last feature in which other cement manufacturers will be most interested. Because electricity is taking the place of man-power in every industry, and this is particularly so in the portland cement industry. The Great Lakes plant, an operation employing 11,000 hp., has been made as nearly automatic as it is possible to design a cement plant today.***

***To describe the electrical equipment adequately required the pen of an electrical engineer versed in other industries as well as in the portland cement industry. The editors were therefore very glad to avail themselves of the opportunity to get Mr. Rogers to contribute this article.—The Editors.***

### Power

Power is purchased from the Buffalo General Electric Co. which in turn gets it from the Niagara Falls Power Co. Power at 22,000 v., 3-phase, 25-cycles is furnished over two lines, each ample to operate the plant. The concrete switch and transformer house is located only 150 ft. from where 70% of the power is used. Lightning protection is afforded by a three-leg, oxide-film arrester. The main oil-circuit breaker has a carrying capacity of 600 amp. and a rupturing capacity in excess of 800,000 Kv-a. The arrester, the circuit breaker and the instrument transformers are in a room by themselves in the transformer house. There are three single-phase transformers with two secondary windings, the 2300-v. windings having a capacity of 2,000 Kv-a. each, and the 460-v. windings being rated 667 Kv-a.—a total of 8,000 Kv-a. for the plant. The transformers are fitted with conservators, which effectively prevent the commingling of atmosphere water vapor and the transformer oil. Power for the shale



***Construction views of Great Lakes Plant—The first pile was driven July 15, 1926, and cement was made June 1, 1927. All buildings are on slag filled land and 400,000 ft. of piling and 40,000 yd. of concrete went into the construction. Reinforced concrete was used for all structures except the kiln house which is covered with cement-asbestos siding***

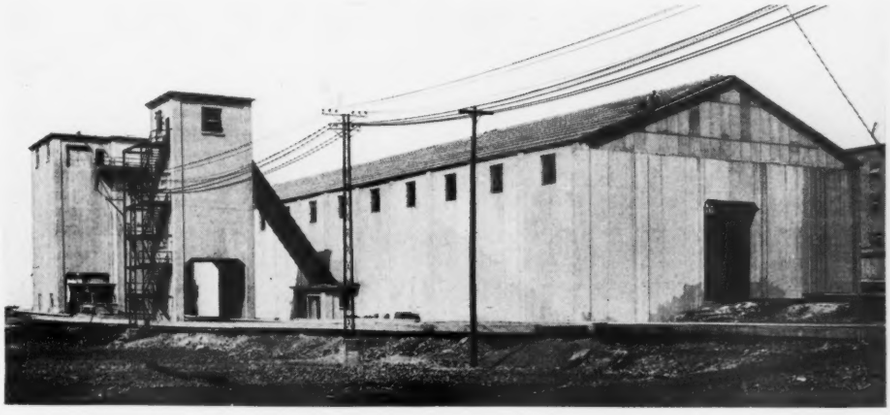
*The plant buildings under construction*

quarry at Shaleton is purchased from the Niagara, Lockport and Ontario Power Co. at 440 v., 3-phase, 25-cycles.

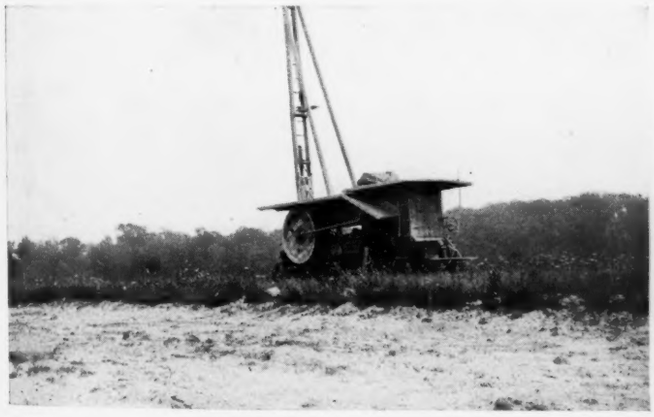
### *Switchgear, Switchboard and Motor Circuits*

A short run of cables connects to 2300- and 460-v. buses in a large, high room with a floor 4 ft. below ground level. All 2300-v. circuits are protected by oil circuit breakers housed in concrete cells. They are of 29,000 amp. short circuit capacity with time limit set to break a short before the main mill circuit breaker can function. Above the cells is the switching structure supporting the buses, the disconnecting switches and circuit breaker solenoids. In this room are two auto-transformers for supplying reduced voltage for starting the principal motors. On the back wall intercepted by suitable pull-in boxes are approximately 150 conduits leading to the back of the main switchboard on the floor above. Lead and jute covered cable is used throughout the mill.

The main switchboard, conceded to be one of the finest boards in any industrial plant, consists of 26 slate panels mounted 8 ft. from the back wall of a large, high, well lighted switchboard room. From left to right there is a main feeder panel with meters on a swinging bracket and next, the



*Shale, coal and crusher buildings*

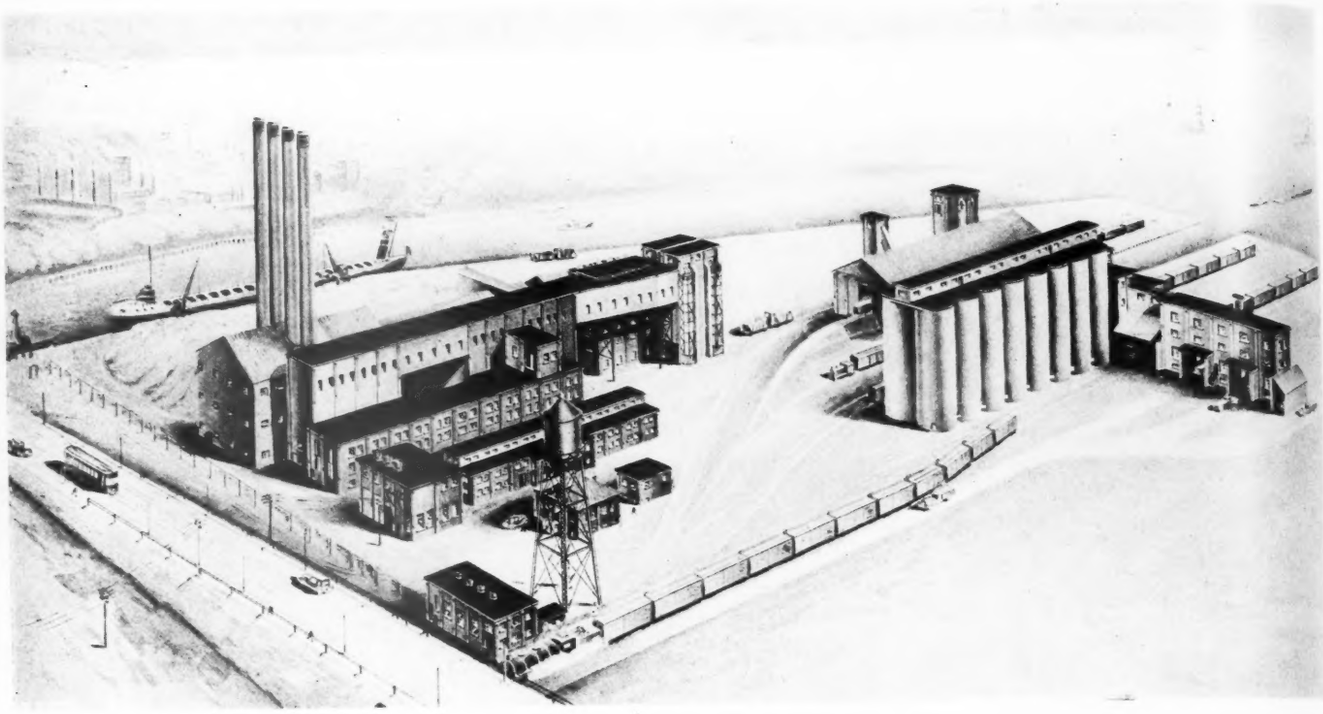


*Well drill working in shale*

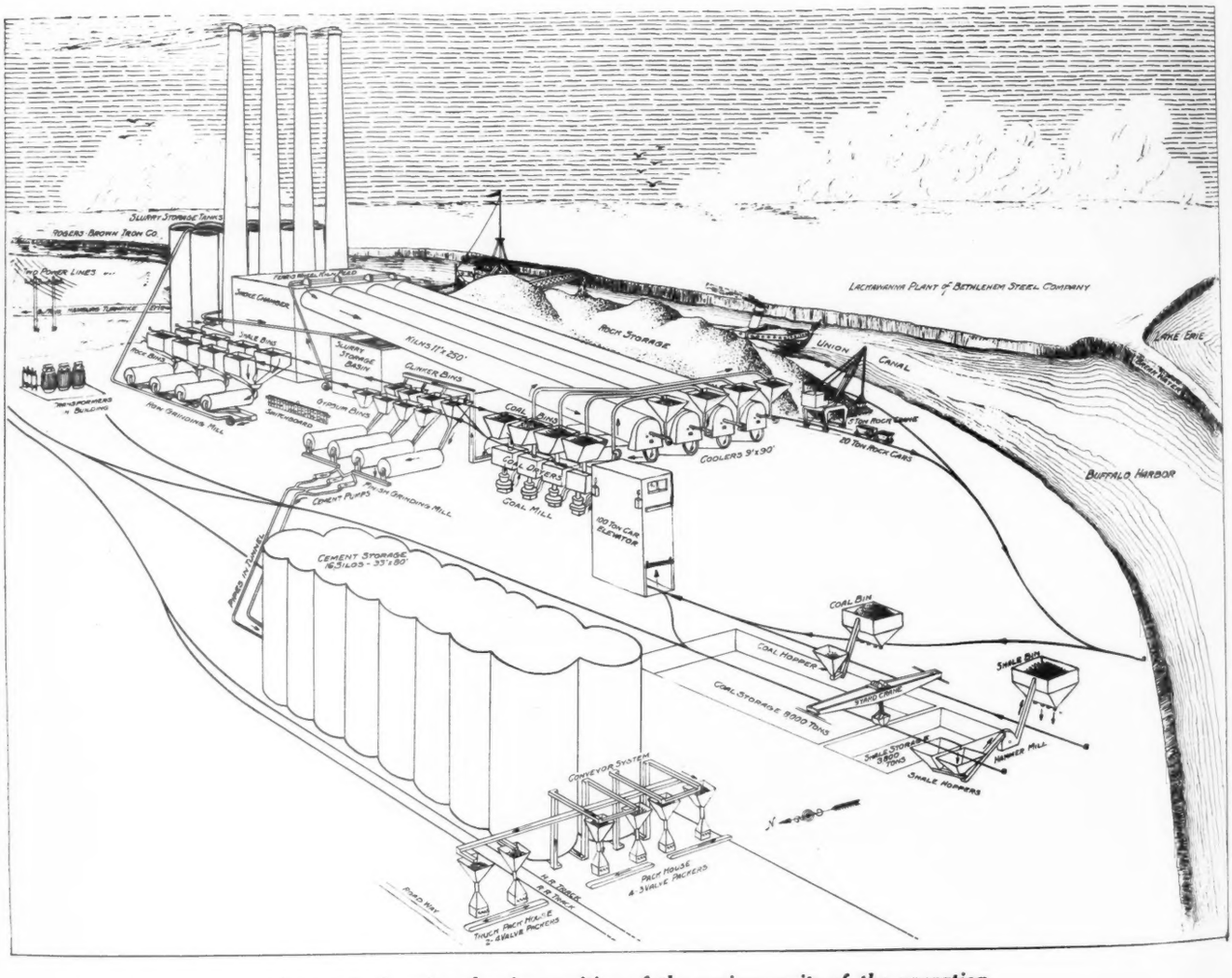
*Shovel in the shale pit*

*Locomotive that pulls cars of shale to the plant*

*Type of electric shovel used in the shale*



*Perspective drawing of Great Lakes plant buildings*



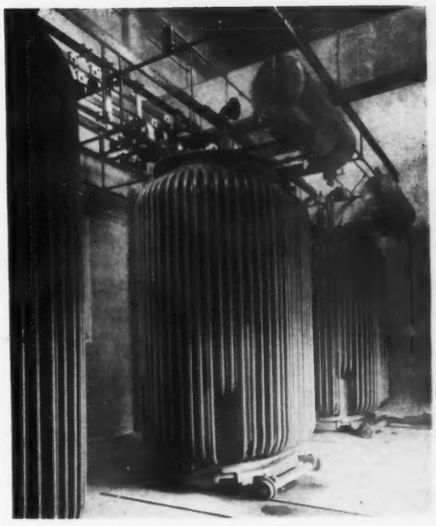

*Isometric drawing showing position of the various units of the operation*

compensator panel. The following eight panels are for controlling eight 800-hp. supersynchronous motors in the raw and finish grinding mills. Behind these panels and above the passage are the eight field rheostats. The adjacent panels control the cranes and raw storage circuits and the air compressor circuit. The next three panels control the motors of the three motor-generator sets which furnish excitation and direct current. Then follow the panels for the raw and finish mill auxiliary circuits, kilns, coal mill, pack house and car elevator. A group of three direct-current generator panels is located near the right end of the board which is completed by the lighting, third rail haulage and battery charging panels with a swinging meter bracket at the end. The board is surmounted at the center by a clock. All of the electrical equipment, including motors and control, is of General Electric manufacture.

*One of the gantry cranes that reclaims limestone from the storage pile and loads it in hopper cars for the mill*

### *Material Handling*

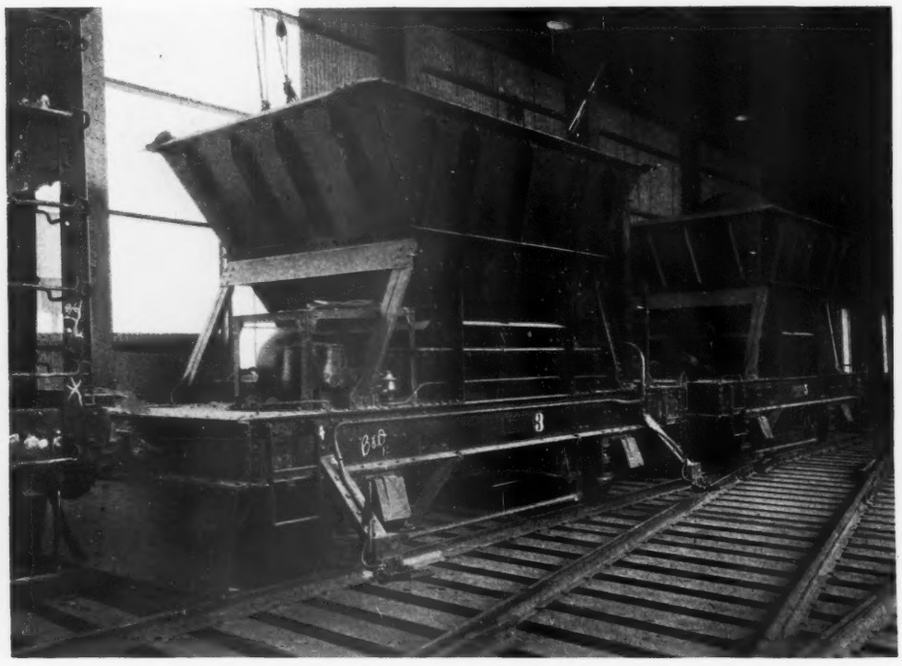
The manner in which material is handled about the plant is unique in many respects and to all appearances the system is working with marked success. There is a great amount of trackage about the yard, much of it fitted with third rail for direct-current haulage. There are three direct-current, electric, burden-bearing cars, each of 20 tons capacity, and two 20-ton trailer cars, to take crushed limestone, shale, gypsum and coal to an electric elevator of 200,000 lb. capacity which lifts them 55 ft. to bin tracks which serve a total of 16 bins. This elevator was built and equipped by the Atlas Car and Manufacturing Co. The materials are fed by gravity to the machines below.



*Single-phase transformer with 2300-v. and 480-v. secondary windings*

The power cars for the system are of the four-wheel type with a 75-hp. motor at each axle. A cab is provided for the control and the operator. A motor-driven air compressor furnishes air for brakes and for dumping. The 20-ton hopper is lined with renewable high carbon steel plates and is bottom-dumped by air. Couplers are arranged to couple with standard railroad equipment, as these units are used to handle railroad cars as well. The trailers are duplicates of the power cars except for the omission of cab, motors and compressor. An air pipe and hoses make the air devices operative from the power car. These units

*Cranes unloading limestone from a ship and placing it on the stockpile*



***Motor car and trailer for handling stone, shale and gypsum. The railway gondola car at the extreme left brings coal. The cars are shown at the top of the elevator to the mill building***

were furnished by the Atlas Car and Manufacturing Co. A Plymouth (Fate-Root-Heath Co.) gasoline locomotive does the routine yard shifting.

Limestone is loaded from the storage piles into the hoppers of power cars and trailers by three Orton Crane and Shovel Co. electric portal whirler cranes equipped with 5-ton buckets. These cranes are each equipped with a 187-hp., squirrel-cage, induction motor. Four or five bucket cycles fill a 20-ton hopper. The car or train switches to the elevator and discharges into the limestone bins over the raw grinders.

The Shaleton quarry is worked by a Loomis Clipper electric well drill, a Bucyrus 50-B electric shovel utilizing wound-rotor induction motors of the shovel type, and a Plymouth gasoline locomotive.

At the mill, shale is discharged from gondola cars into an under-track hopper whence it is conveyed by a belt to the Dixie hammer mill. The crushed shale is elevated to a bin having four discharge chutes. The 20-ton hopper cars are run under these chutes, filled and run to the elevator. Shale is discharged into four bins opposite the rock bins over the raw grinders. Standard railroad coal cars are run on to the elevator by the gasoline locomotive or by a hopper car acting as a shifter. A hopper car on the upper level shunts the coal car on to the track over the four coal bins. Coal feeds by gravity to the dryers and then to the pulverizing mills. Gypsum is handled in the same way to bins over the finish mills where it is screw fed to the table feeders for the mills.

Slurry is pumped from a screw-agitated sump under the raw mills to the twelve storage or correcting tanks by three 4-in., Wifley, centrifugal pumps. Three similar pumps deliver the slurry to the storage basin, also transfer slurry from one tank to another for correction purposes, and again three similar pumps lift the slurry to the sump under the Ferris-wheel kiln feeders.

Clinker normally spills from the coolers into a pivoted bucket carrier which elevates it to the four bins over the finish mill. The clinker pit is gated, however, so that clinker may be discharged hot to a drag conveyor which in turn discharges to an outside pit. This outside clinker can be reclaimed by the cranes and hopper cars and delivered to the clinker bins over the finish mills which are normally fed by the carrier from the coolers. The carrier and drag conveyor were furnished by the Chain Belt Co.

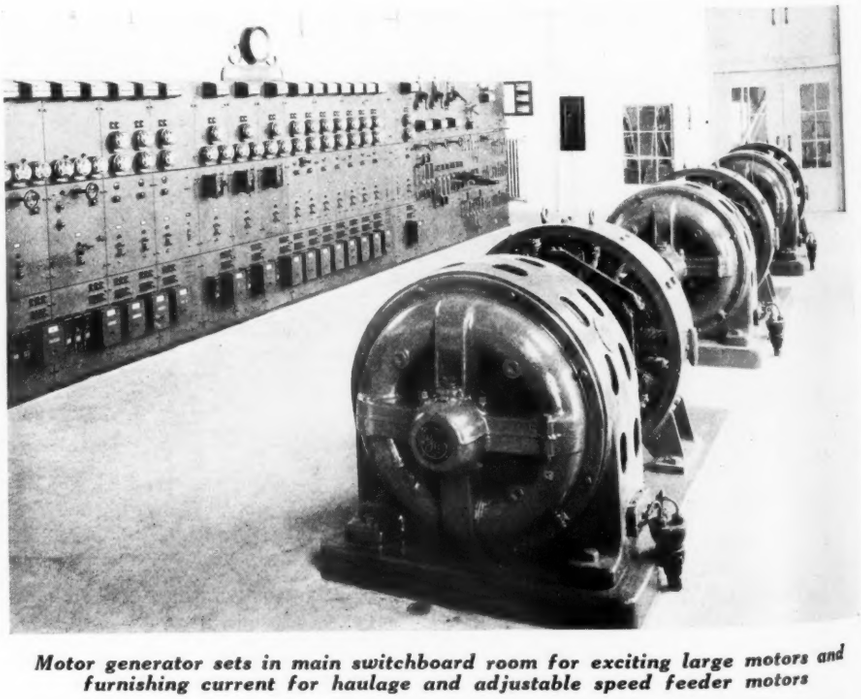
Screened cement is pumped by air through Fuller-Kinyon pumps from the finish mill, a maximum of 800 ft., to the silos and pack house. An elaborate system of cross-connected conveyors supplies the pack house and truck pack house and reclaims the spill. Belt conveyors under the packers are reversible so that cars can be filled on any or all of the three tracks, and trucks can be loaded on the roadway.

Covered storage is provided for 8,000 tons of coal and 3800 tons of shale in one building having a somewhat elevated track through the middle and a 3-yd. Whiting crane overhead. A hopper with conveyors to an elevated coal bin over the tracks outside provides for reclamation of coal. Another hopper feeding to the hammer mill is used in reclaiming the shale.

### *Machines, Motors and Control*

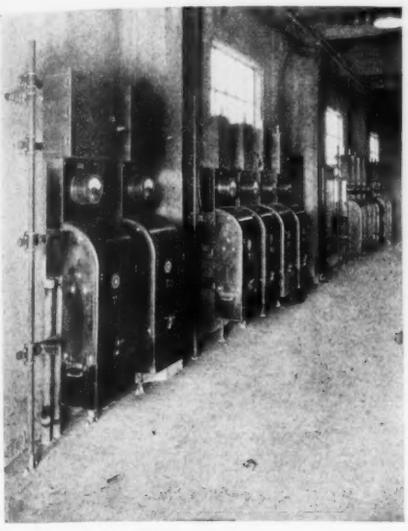
There are three induction motor-generator sets in the switchboard room with direct-current outputs of 250 kw. each at 250 v. They supply excitation for the supersynchronous motors and direct-current for the third-rail haulage, the kiln slurry feeds, the kiln coal feeds, the finish mill feeds and the machine tool motors. They are arranged to be interchangeable singly or by groups giving a maximum of flexibility in application.

The shale crusher is a Dixie "Mogul" hammer mill, driven by a wound-rotor induction motor rated 300 hp., 750 r.p.m. 2200 v. The control is of the drum-switch type with starting resistance only. The control panel carries an ammeter, an oil circuit breaker and time limit overload relays. The



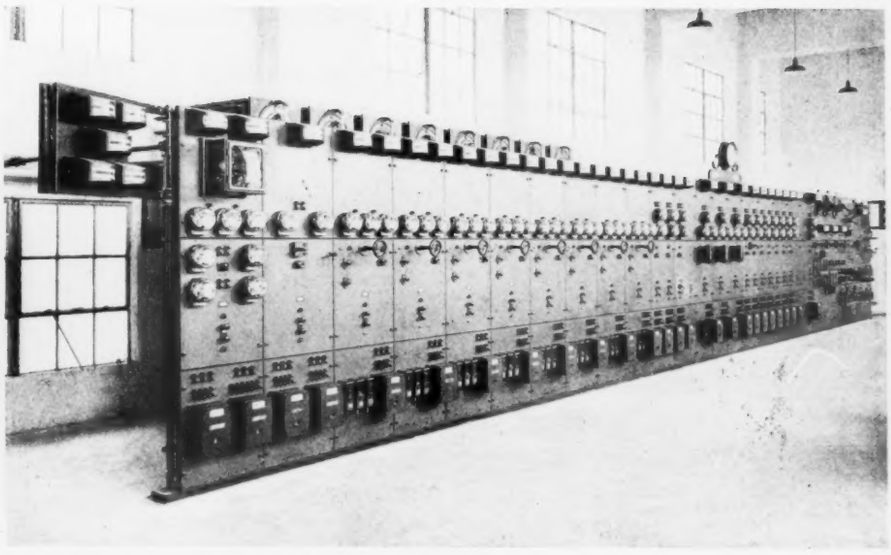
***Motor generator sets in main switchboard room for exciting large motors and furnishing current for haulage and adjustable speed feeder motors***

shale belt conveyor to the hammer mill is 36 in. wide, 62½ ft. long, and is operated at 125 ft. per minute by a 10 hp., 750 r.p.m., squirrel-cage motor with compensator starter. A bucket elevator takes the crushed



***Manual starting compensators for coal mill motors***

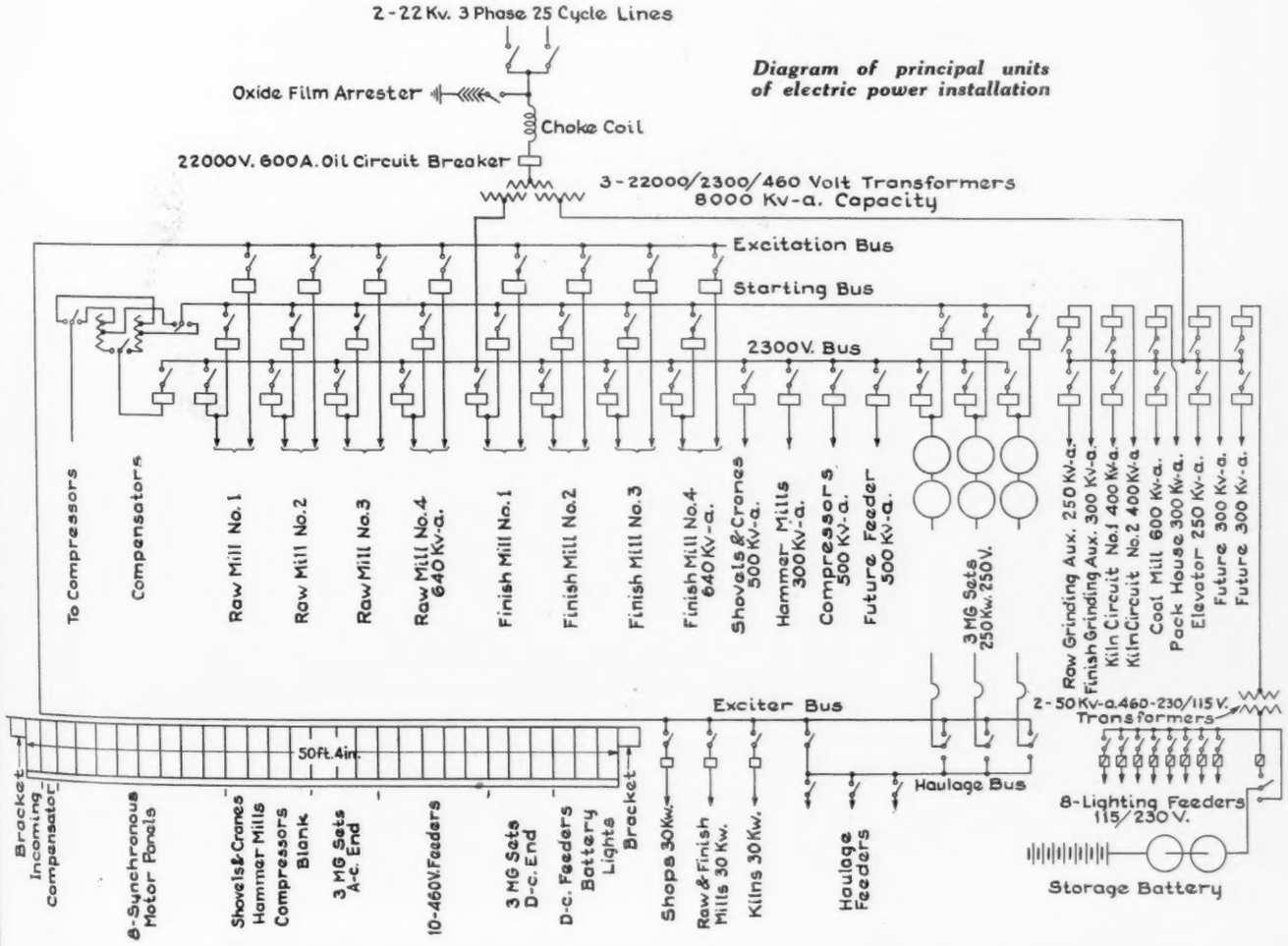
shale to the over-track bin and is driven by a 25 hp., 750 r.p.m., squirrel-cage motor. Other shale mill auxiliaries are apron feeders and a dust collector fan. The latter is a No. 40 Northern Blower Co. fan with arrester and it requires a 15 hp., 1500 r.p.m., direct-connected, squirrel-cage motor. The shale mill is designed to handle 75 tons per hour.

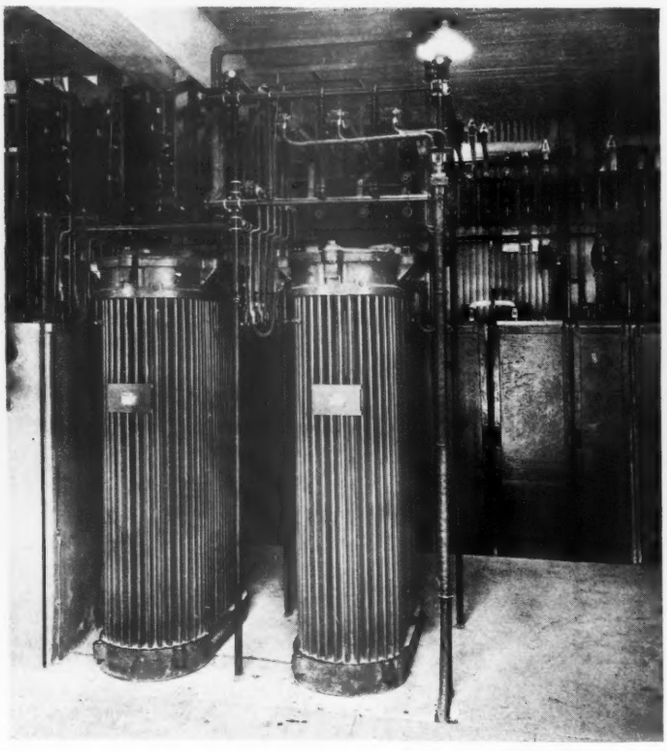


***Main switchboard of 26 panels, 51 ft. long. Eight center panels control 6400 hp. in eight large motors***

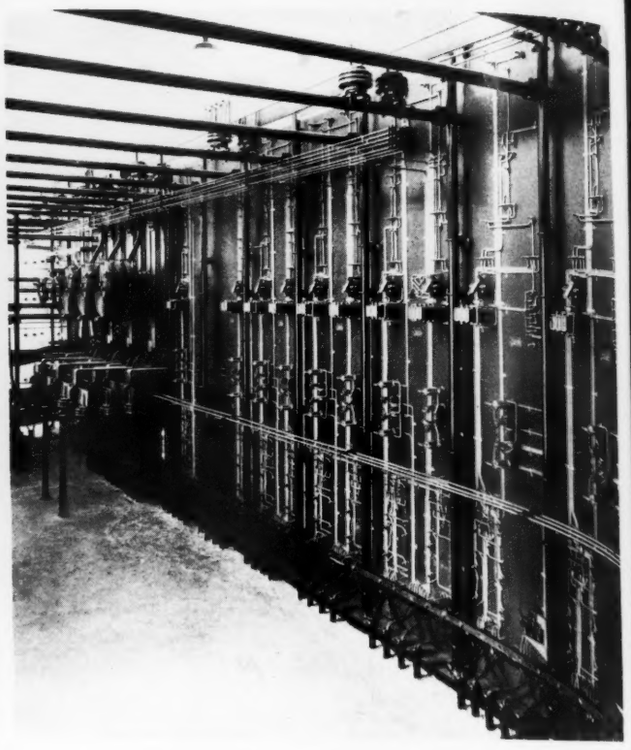
The coal storage house is equipped with a 30 x 30 Jeffrey coal crusher, a feeder and an elevator in order to utilize run-of-mine coal if necessary. The crusher is powered with a 25 hp., 750 r.p.m., squirrel-cage motor. The elevator is 72 ft. long on a 55-deg. angle and is driven by a 20 hp., 750 r.p.m., motor. The coal crusher plant is designed for a capacity of 60 tons per hour. A Whiting 3-yard crane spans the storage building

***Diagram of principal units of electric power installation***





*Auto transformers supplying reduced voltage for starting principal motors*



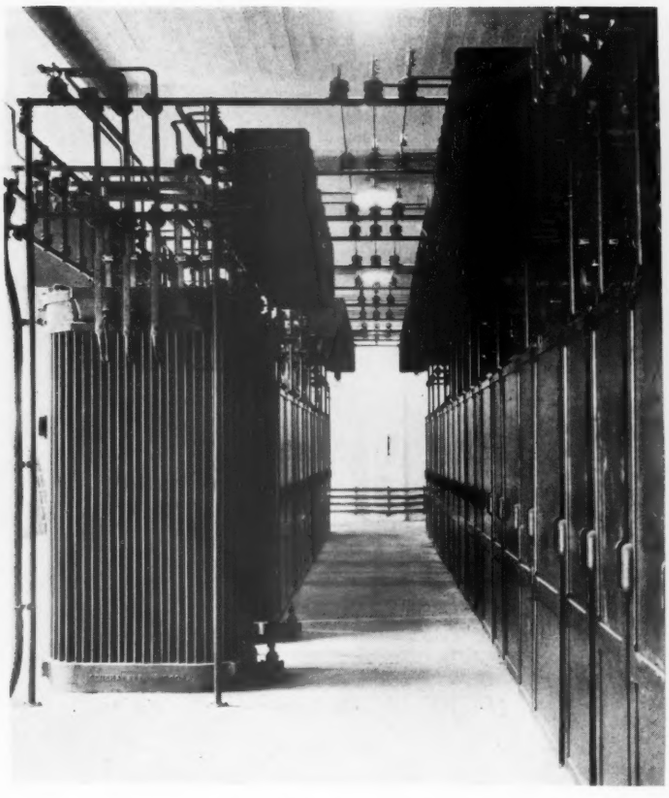
*Rear view of middle portion of the main switchboard shown on page 61*

and serves to reclaim both coal and shale. It is powered with 50 hp., 500 r.p.m., hoist and hold motors, a 40 hp., 500 r.p.m., bridge motor and a 15 hp., 750 r.p.m., trolley motor.

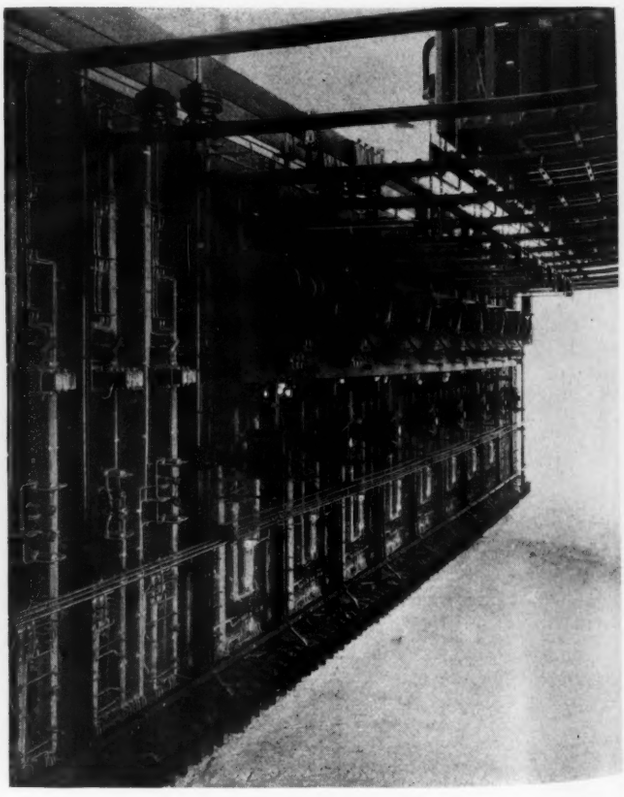
The belt conveyor, bucket elevator and pan feeder for handling shale and the feeder and elevator in the coal mill were furnished by the Chain-Belt Co.

### *Material Elevator*

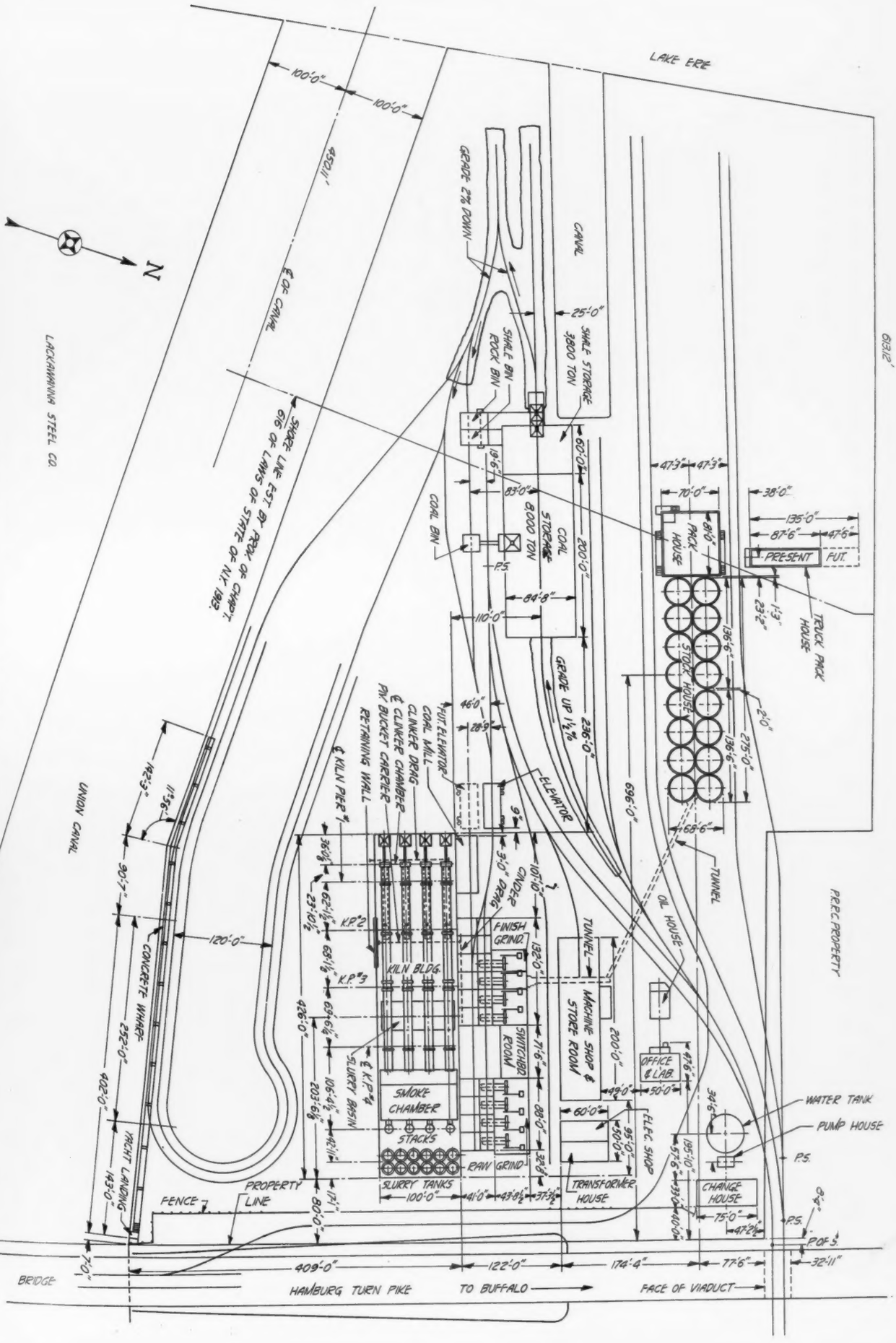
The material elevator is of particular interest. All rock, shale, gypsum and coal goes up this elevator to the bin top level either in the 20-ton hopper cars or in standard railroad gondolas. The elevator is rated 100 tons at 30 ft. per minute and 55-ft. lift. The equipment, as already stated, was fur-



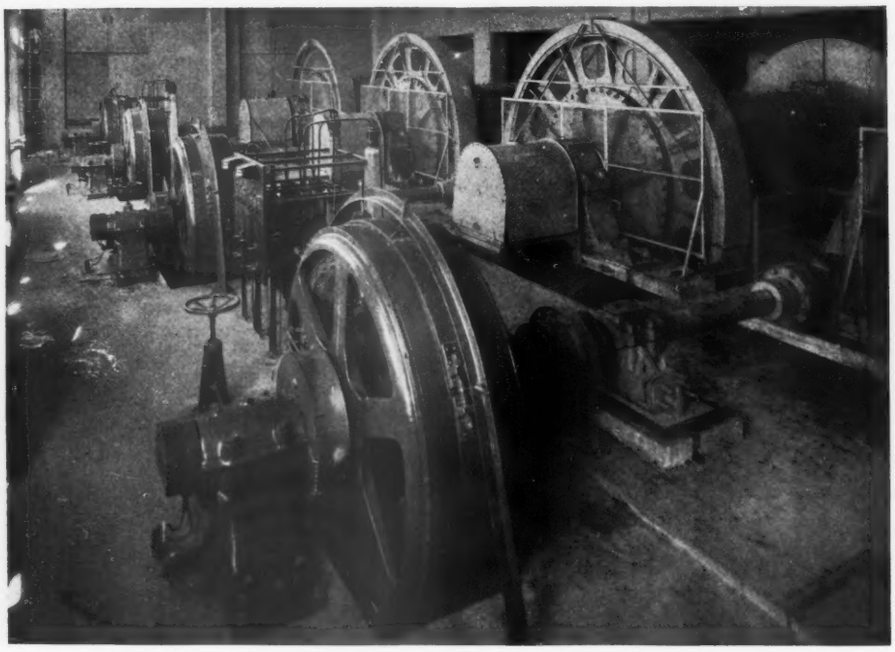
*Switching structure for main switchboard*



*Rear view of supersynchronous motor control panels*




**This ground plan shows arrangement of buildings, the dock and railroad lines**



*Raw-grind mills, 30 ft. long, and 800-hp. motors*

nished by the Atlas Car and Manufacturing Co. The elevator motor is rated 175 hp., 600 r.p.m., 250-v. direct-current, with variable generator voltage or Ward Leonard control. The motor-generator set consists of a squirrel-cage, 200-hp., 750 r.p.m., motor, a 165 kw., 250-v. generator and a 7-kw. exciter which excites the fields of both the generator and the elevator motor.

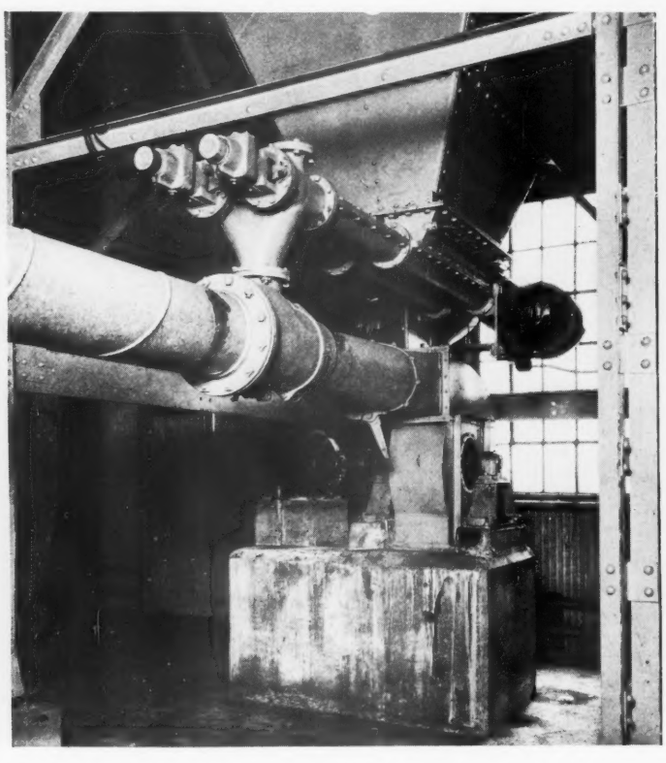
For acceleration and retardation, the generator voltage is automatically adjusted by limit switches at the two levels once the machine is put in motion by a push button. The platform is automatically spotted at the stops but, because of unequal stretching of the ropes, a short, hinged, track section is used at the upper level to insure matching the rails. Automatic gates protect the pit whenever the platform is up.

The elevator is so counterweighted that the power to hoist a load is only equal to that required to lower the empty platform. With automatic acceleration and counterbalanced operation the power consumption is very conservative for the duty and the operation is conspicuously successful. Net loads are 20 or 40 tons for shale and rock according to whether a power car is used alone or with a trailer. Coal and gypsum usually is handled in full standard railway car loads ranging from 40 to 60 tons. With a daily input of approximately 2500 tons, or about 100 tons per hour, it can be readily seen that the elevator is not hard pushed to keep up with the demand.

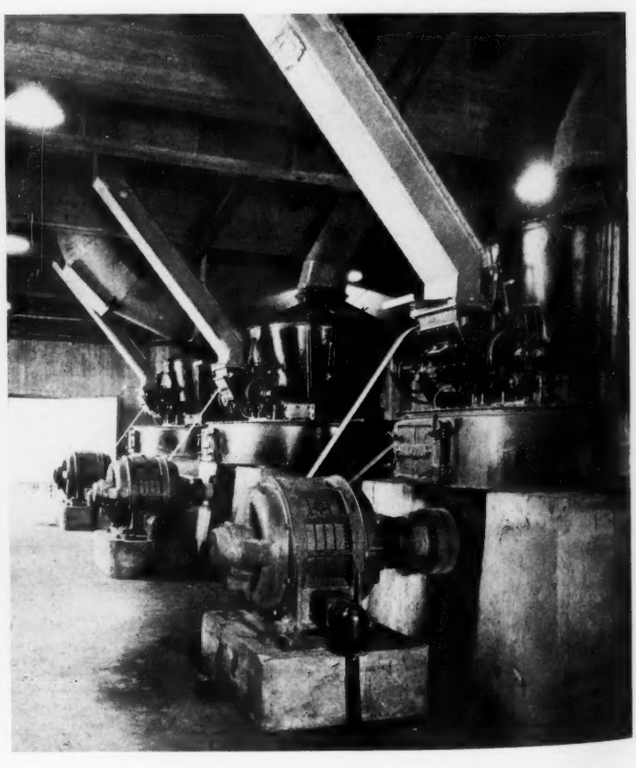
### *Raw Grinding*

Raw grinding is done by four Allis-Chalmers 8 ft. x 30 ft. combination ball mills, each driven by an 800-hp., supersynchronous motor at 187 r.p.m.,—the gear reduction being 9.65 to 1 in one step. These mills, as well as the finish mills, each require 75 tons of grinding balls. The stators of these motors are started automatically and phased-in at the main switchboard by the authorized attendant who pushes the proper button upon an interlocking signal from the motor room. The rotors and consequently the raw mills are started and stopped by the application or release of the band brakes about the stators. Thus the starting and stopping of the mills are purely mechanical operations consisting of turning the brake handwheel.

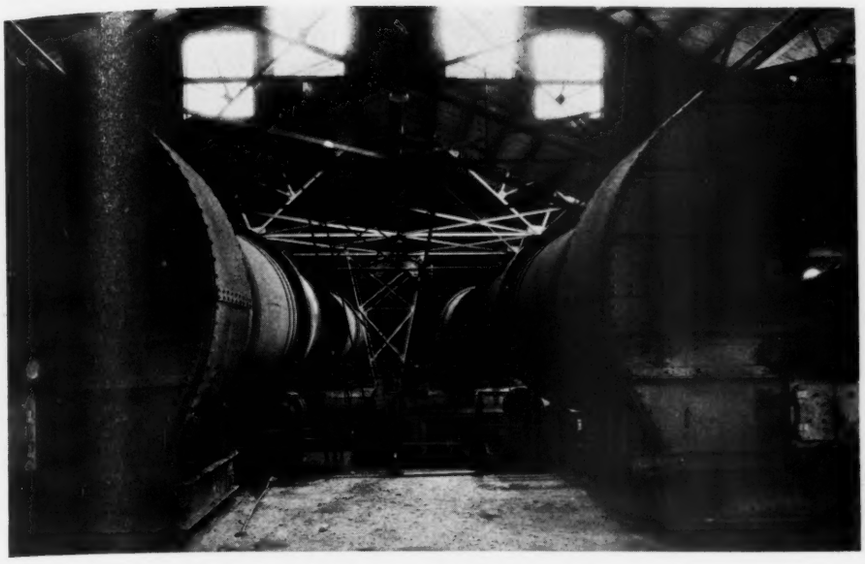
The auxiliary control panel at the motor carries the signal buttons and an oil switch which acts as a disconnect, should it be necessary to do work about the motor. The oil switch will carry the full stalled rotor



*Coal feed, operated by two adjustable speed motors, fan and 30-hp. motoss*



*Coal pulverizers in the coal mill and their 60-hp. motor drives*



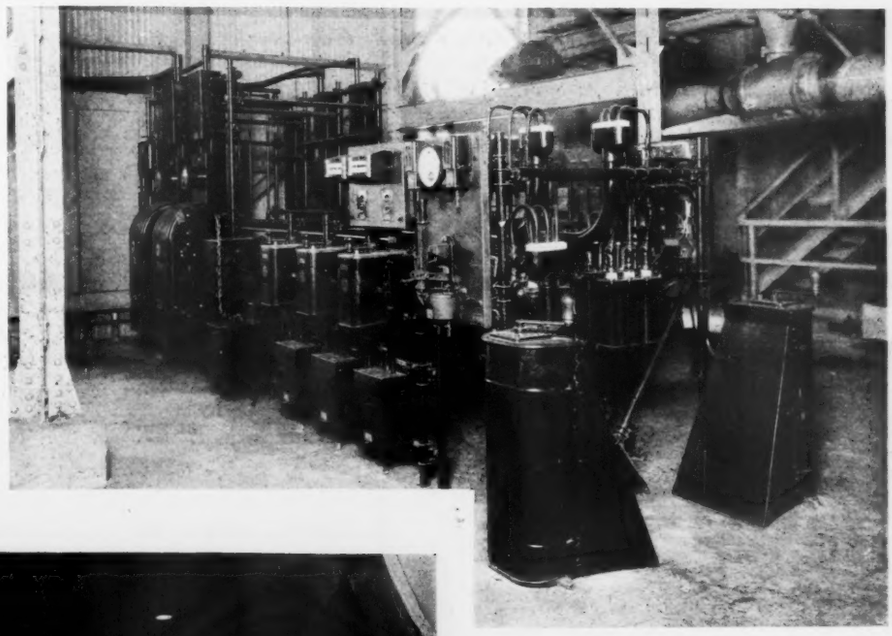
*Looking between two of the four kilns*

current. By this arrangement no unauthorized person can start a motor and the authorized person can withhold starting if the load schedule warrants. Being fully automatic all starts are alike as to current inrushes. The mechanical starting of the rotor by stopping the stator takes about 15 seconds of smoothly graduated retardation proportional to the brake drag. The current inrush is thus minimized and kept under complete control.

The raw mill auxiliaries include a slurry screw agitator with 7½ hp., 750 r.p.m. motor drive, and three 4-in. Wilfley slurry pumps lifting to the twelve slurry storage or correction tanks. These pumps are driven by 30-hp., 1500-r.p.m., motors with magnetic control and push-button stations. The raw mill feed is driven by chains from the mill itself. The slurry contains about 36% water and has a specific gravity of 1.3.

The twelve slurry storage tanks are circular and the normal depth of slurry is about 50 ft. Agitation is obtained by air jets utilizing a 1-in. pipe in each tank taking air at 70 lb. which becomes a net pressure of 40 lb. The pipes are fitted with solenoid valves and a motor-driven time commutator gives air to each tank for one minute out of every six.

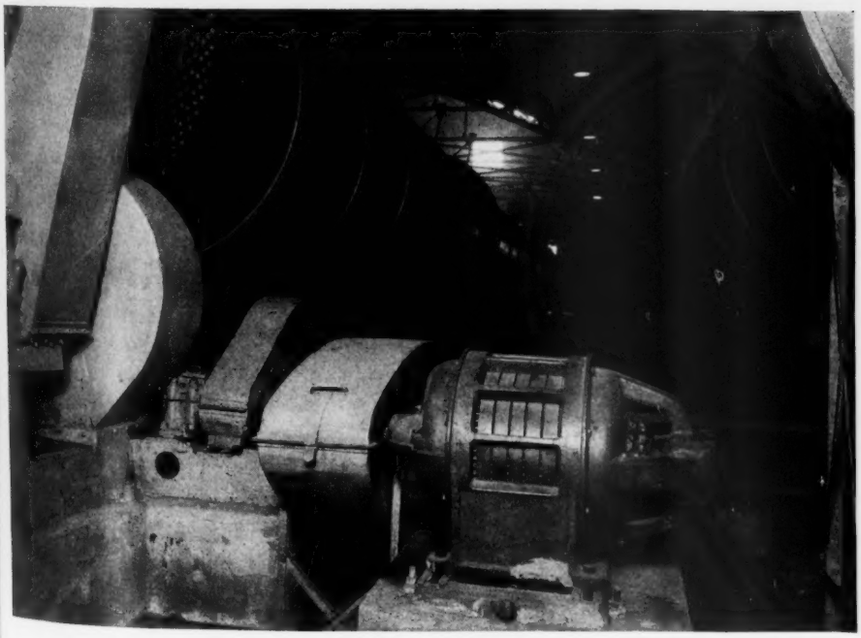
Three slurry pumps similar in every detail to the raw mill pumps lift the liquid to the slurry storage tank which extends over 100 ft. across the mill under the kilns. An agitator bridge, carrying three rotating, vertical paddle shafts, traverses the tank continuously. The bridge is moved by a 7½-hp., double-squirrel-cage motor designed for full voltage starting to make it adaptable for automatic control by a reversing magnetic controller and push buttons actuated by dogs at the track ends. The agitator shafts



*Controls for two of four kilns*

are driven by a 10 hp., 750 r.p.m., squirrel-cage motor with magnetic control. This agitator was furnished by the F. L. Smidth Co.

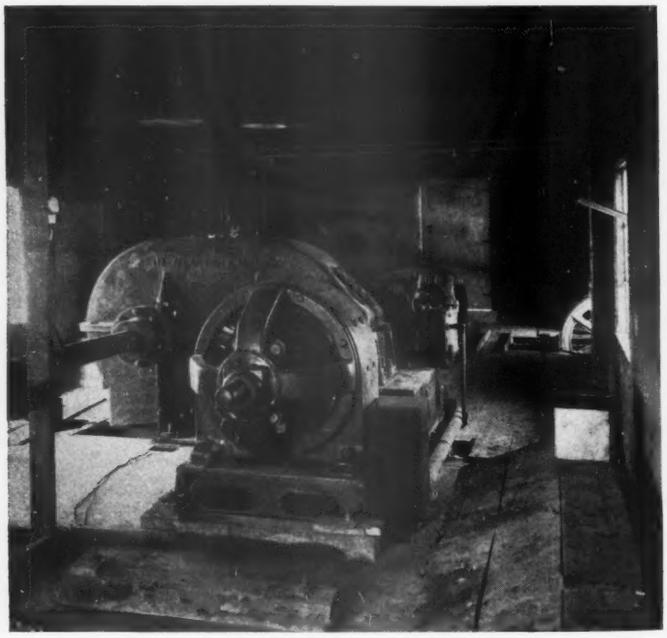
The Allis-Chalmers Ferris-wheel type feeders are kept supplied with slurry by three Wilfley pumps similar to the other slurry pumps just described. Four adjustable-speed, direct-current motors rated 1¾ hp., 300 to 900 r.p.m., 250 v. rotate the Ferris-wheels. They are controlled by drum switches and field resistors on the firing floor.



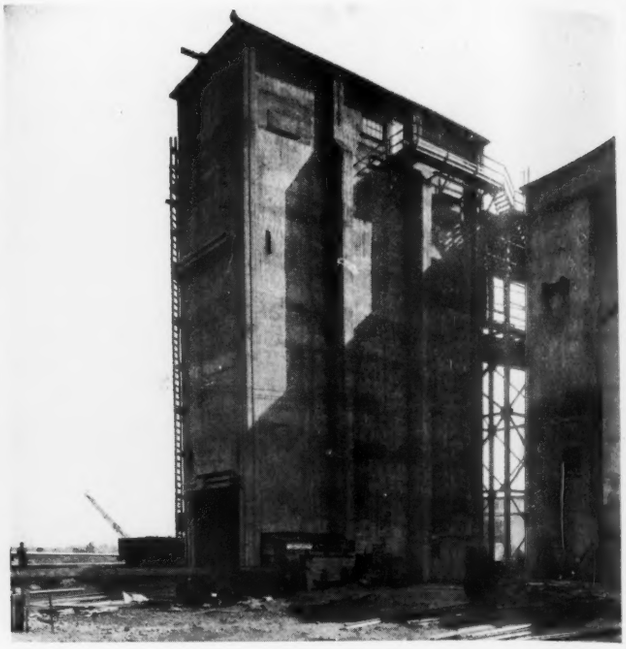
*Motor and gearing of kiln drive*

### *Kilns and Burners*

The four Reeves Bros. kilns are 250 ft. long and 11 ft. in diameter; they weigh approximately 500 tons each and are rotated at about 40 revolutions per hour. They are driven by 100 hp., 375 to 750-r.p.m., 440-v.,



*Direct connected motor and hoist that raises the car elevator*



*Car elevator for lifting cars of coal, shale and gypsum*

wound-rotor, induction motors, controlled by drum switches and resistors at the firing floor. The eight kiln dampers are regulated by 1-hp., squirrel-cage motors controlled by push-buttons at the firing floor where indicators show the damper positions.

Pulverized coal is fed to each kiln by two screw feeds, though each is capable of feeding sufficient coal by itself. Each screw is driven by a 1¾-hp., 300 to 900-r.p.m., 250-v., direct-current motor controlled by drum switch and field resistor. The feeds are 6-in. duplex of Fuller-Lehigh make. Some 25% of the primary air is supplied with the coal to each kiln by a 50-in. Buffalo Forge Co. special fan driven by a 30-hp., 1500-r.p.m., direct-connected, squirrel-cage motor with compensator control. The combustion air comes from the coolers at 590 deg. F. The smoke chambers are very large and the major part of the dust is settled out so that the stacks show but little smoke. The stack temperatures range from 850 deg. to 950 deg. F. Dust screws beneath the chambers are operated by five 5-hp., 750-r.p.m., squirrel-cage motors.

The Reeves Bros. coolers are 90 ft. long by 9 ft. in diameter, driven by 50-hp., 900-r.p.m., squirrel-cage motors with compensator control on the firing floor. The Chain-Belt clinker drags and carrier are powered by two 10-hp. and a 25-hp. motors for 75 tons-per-hour duty.

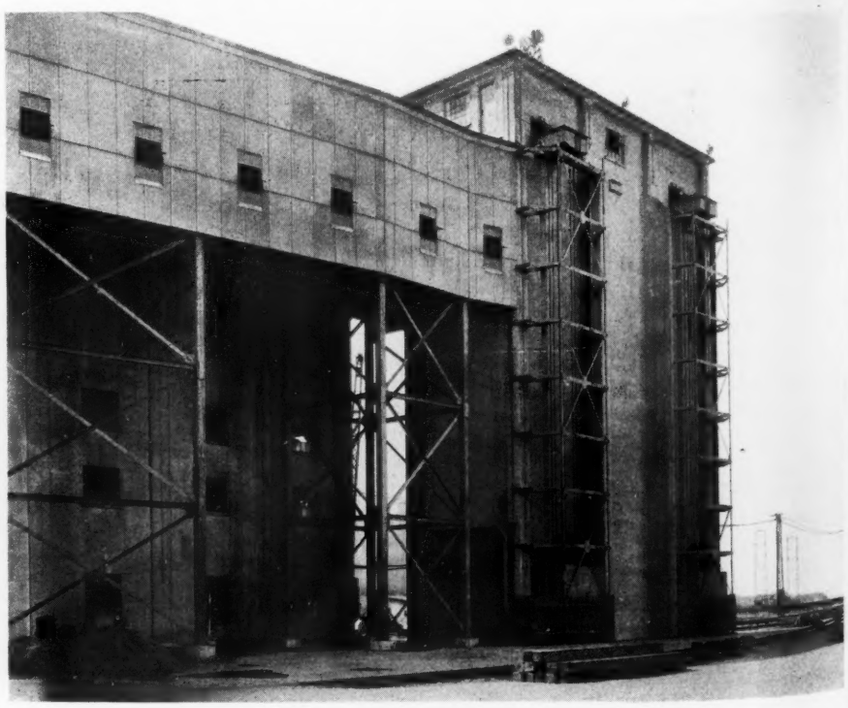
The brick liners for kilns and coolers were furnished by the Harbison-Walker Co.

The firing floor control groups are arranged in two pairs and include, as previously stated, the kilns, kiln feeds, kiln dampers with indicators, coolers, coal feeds, primary air blasts and clinker drags and carrier. Some of the motors thus controlled are nearly 300 ft. away from the switchboard.

### *Coal Mill*

The coal mill includes four of each of the following: coal bins, coal dryers, Raymond Bros. impact pulverizers, hot air exhaustors and pulverized coal fans. The vertical direct-heat coal dryers operate at 590 deg. F. on the waste heat from the clinker coolers, the Buffalo Forge Co. exhausters on the coolers being driven by 30-hp., 750-r.p.m., squirrel-cage motors. These dryers are of the Fuller Randolph vertical type, and the drying is done with the hot gases from the clinker pit under the kiln discharges. The grinding mills are the Raymond low side mill type. Eight fans and eight cyclone collectors complete the four dryer units and the four pulverizing units. The Raymond mills are driven by 60-hp., 500 r.p.m., squirrel-cage motors and the Raymond coal fans are driven by 40-hp., 1500-r.p.m., direct-connected, squirrel-cage motors. The compensators for these 12 motors are arranged along the wall on the ground floor of the coal mill.

The four dry or finish mills are Allis-Chalmers combination mills similar to the raw mills. They are driven by 800-hp., 187-r.p.m., 2200-v., supersynchronous motors,



*Another view of the car elevator showing runway for cars to bins*

duplicates of and controlled like those in the raw mill. The dry mill table feeders, which also drive screw gypsum feeds are motored with 1¾-hp., 300 to 900-r.p.m., 250-v., direct current units with drum switches and field resistors. Finish mill auxiliaries include screens driven by 10-hp. motors and three Fuller-Kinyon, 6-in. cement pumps, each driven by a 100-hp., 1500-r.p.m., squirrel-cage motor. Compensators are located in the pump room. All motors are interlocked to prevent a choke-up of the system. At the top of the dry mill are ten Northern Blower Co. dust collectors, actuated by two fans of the same make driven by one 30-hp., 1500-r.p.m., squirrel-cage motor with two shaft extensions. The screened dust collectors discharge in rotation by the breaking of the vacuum, which is accomplished by a motor-driven "chronometer" valve.

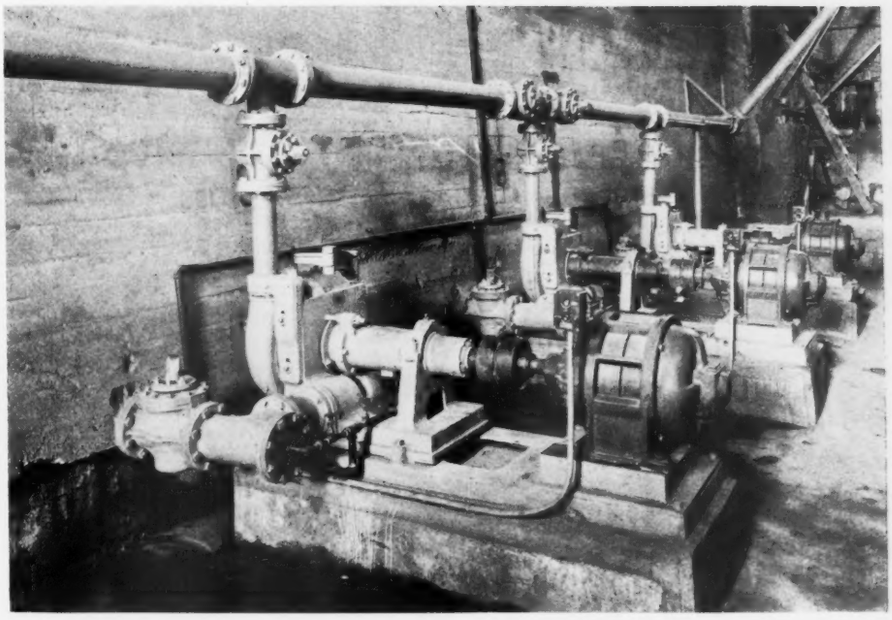
### *Silo Storage*

Sixteen cement silos, each with active space 33 ft. in diameter by 80 ft. in height and having a total capacity of 350,000 bbl. of cement, are arranged double file in two groups. Each silo feeds to two screw conveyors making eight in all, each driven by a 25-hp., 750-r.p.m., squirrel-cage motor. A cross screw conveyor is driven by a 7½-hp. motor. Four elevators supply the main and truck pack houses, and the elevators and attached screens each require a 15-hp. motor. Spill elevators and screens, and various other auxiliary conveyors, require motors from 5 to 20-hp. making a total of 17 packhouse conveyor and bag belt motors.

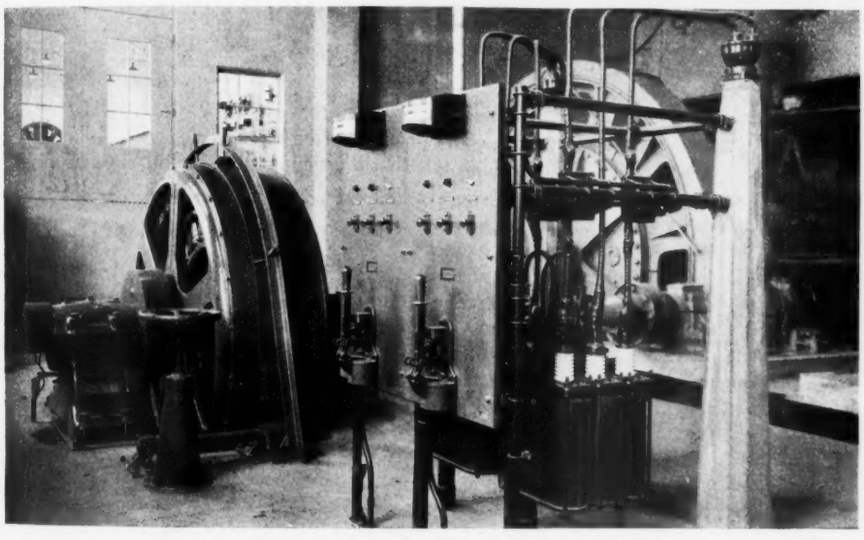
Four 3-valve Bates packers take 20-hp. each and two 4-valve packers take 25-hp. each. Northern Blower Co. dust collectors take two 20-hp. motors and one 15-hp. motor and various other auxiliaries account for eight motors ranging from ½ to 25-hp., the latter operating the bag wheel.

A large machine shop and storage building stands directly west of the transformer house. It is served by a standard gauge track and contains an assortment of twelve machine tools all individually motor-driven. The bolt machine and planer have direct-current motors with speeds of 500 to 2000 and 250 to 1000 respectively. An annex houses two Bury 19 x 12 x 14 in. 780-c.f.m., 125-lb. compressors and two Ingersoll Rand 19 x 12 x 14 in. 1100-c.f.m., 70-lb. compressors. Each compressor is belt-driven by a 150-hp., 500-r.p.m., 2200-v., squirrel-cage motor. These motors are started on low voltage derived from the auto transformers that start the eight 800-hp. supersynchronous motors, but utilize high voltage taps.

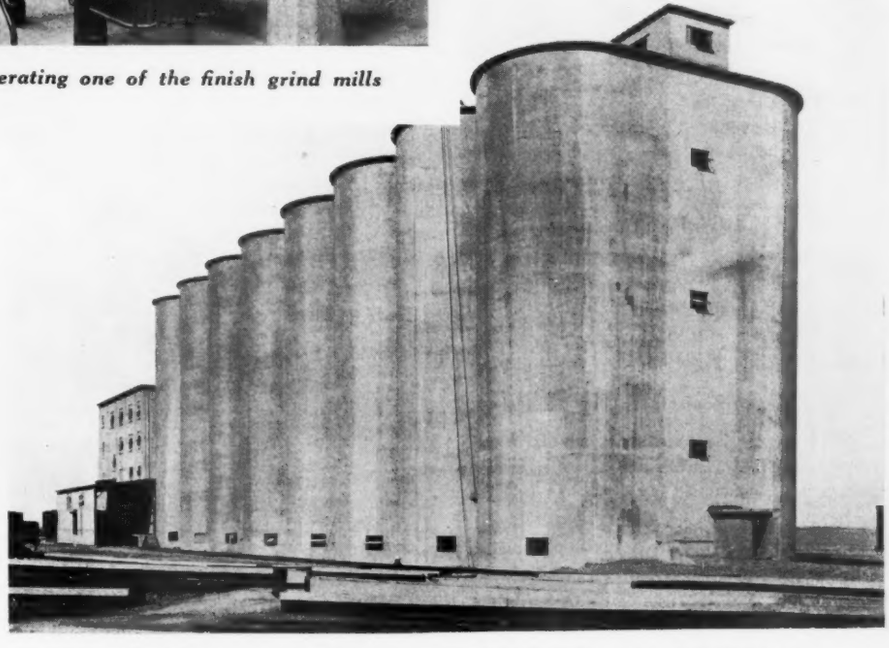
The transformer house contains the elec-



***The 4-in. slurry pumps have 30-hp. motors which have magnetic control and push buttons at the motors***



***Motor and auxiliary control panel operating one of the finish grind mills***



***The silos, 33 ft. inside diameter and 80 ft. high, hold 350,000 bbl.***

trician's shop on the first floor and the chief engineer's office and drafting room on the second floor. The main office and laboratory is in a separate building of attractive design. A well arranged change house and cafeteria is much appreciated by the 250 employees. Outdoor workings are lighted by a large number of powerful floodlights. A small pump house encloses a 750-g.p.m. Worthington pump driven by a 20-hp., 1500-r.p.m., squirrel-cage motor. This serves to keep an elevated tank filled to maintain a suitable head. The motor control is automatic by pressure switch and magnetic controller.

*M. H. Hammond*

### *Summary Notes*

This 7,000-bbl. mill is operated by approximately 182 motors aggregating 11,000-hp. The total installed hp. in supersynchronous motors exceeds that of any other industrial plant. Everything is electrically operated, even to the big siren whistle.

Some outstanding features are: The absence of raw materials in place at the plant; the very low cost of power in the vicinity of Niagara Falls; the elevator system for raw materials, and the speed with which the mill was brought up to a high rate of production. Centralized main switchboard control of principal motors, while not new, is more extensively used here than elsewhere. All geared speed reducing units are Farrell herring-bone type. All chain drives are of Morse manufacture. Third-rail haulage with power and trailer hopper cars with the power cars capable of doing heavy switching work insures a continuous supply of materials with small power consumption and low maintenance cost.

*A. T. Bevier*

It is little enough to say that the plant of the Great Lakes Portland Cement Corporation is something to which all who have had to do with its consummation may well point with pride.

### *Economics*

Buffalo, with its environs, is an extremely active community in business and manufacturing and hence it presents a healthy market for cement. Taken together with western New York, northern Pennsylvania and eastern Ohio—with due regard to the size, number and locations of other cement mills—the potential market justified the erection of a mill having an immediate capacity of 7,000 bbl. of cement per day. Low-cost, reliable electric power from Niagara Falls is a strong factor in favor of the mill's success. Shipping facilities, in and out, are well provided by water, rail, trolley and highways. Labor is plentiful, of good character, and near at hand.

The Great Lakes Portland Cement Corporation was organized and financed by Adam L. Beck, its president. The Lehigh

*Adam L. Beck*

Portland Cement Co., a heavy investor in the plant, markets the product under the brand name "Lehigh." M. H. Hammond, well known in the cement industry, is vice-president and manager, and with Adam L. Beck, is responsible for the plant layout. Marshal Beck is secretary and treasurer. The chief engineer, J. B. Zook, was largely responsible for the electrical features. A. T. Bevier is superintendent, G. H. Smith is chief electrician and A. J. McGraw is assistant superintendent. The plant was erected by the Burrell Engineering and Construction Co., of Chicago, and the machinery was all installed by the Great Lakes Portland Cement Corporation.

### *Popular Facts*

An article published in the *Buffalo Courier-Express* of August 7 gives some popular facts about the Great Lakes plant, and what it means to the city of Buffalo, which will bear repetition here. The following is a quotation:

*A. J. McGraw*

"Figuring what this plant means to Buffalo in the matter of tonnage, there will be 600,000 tons of stone annually arriving through the Port of Buffalo. The shale, coal, gypsum and inbound supplies amount to 400,000 tons more. The outbound shipments of cement by rail will amount to 400,000 tons annually. This is an additional tonnage never possessed by Buffalo before of 1,400,000 tons annually, an item of importance both to the city and the carriers.

"The Great Lakes Portland Cement Corp. has stockholders both in New York state and the Middle West. Buffalo is well represented on the list of stockholders and has two members on the board of directors. Many of the stockholders have been in all of the companies that Mr. Beck has organized. All of them, especially the Buffalo stockholders, have been faithful and energetic in working for the best interests of the company in every respect.

*Marshall Beck*

"With the close of the second month of operation the officers of the corporation feel that the institution has taken its place solidly among the industries of Buffalo, with a plant that is turning out a high quality of product that is new among the many that are manufactured in the city of Buffalo."

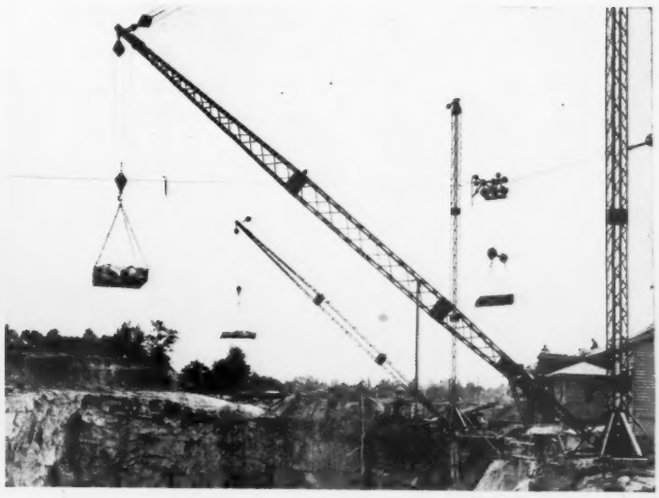
*J. B. Zook*

## Overproduction

INTELLIGENT voluntary curtailment of production must be practiced from time to time. This does not require any agreements that would be illegal under the anti-trust laws as they stand. It is neither cute nor smart, in fact it is scarcely honest, deliberately to overproduce. We individually can not do as the cotton growers did in 1926—leave the curtailment to the other fellow, with the result that we had 47,000,000 acres of cotton. We all know what happened in the way of disaster and demoralization in the cotton belt. We know, too, that the present plight of our own industry is due in no small part to the excessive overproduction of cotton, with consequent low prices. Who are we to blame about 2,000,000 cotton farmers for unwise and unco-ordinated action, when the fertilizer industry with only a few hundred producing units fails to act wisely even in the fact of warnings such as our association statistics have afforded from time to time, and with the knowledge that the buying power of our chief purchaser, the southern cotton grower, has been lessened because nature had smiled upon him when he had permitted himself to over-extend his operations?

A good friend of our industry, Bernard M. Baruch, recently said in another connection: "The law of supply and demand has always worked, but it has worked havoc." Too often this is true.—*Spencer L. Carter, President National Fertilizer Association.*

*Section of quarry face and the cableway hoist house and tower*



*Derricks hoisting stone from the quarry floor 160 ft. below the crusher*

# Typical Carolina Granite Crushing Plant

## Palmetto Quarries Co., Columbia, S. C., Conducts One of the Largest Operations in the South, Producing Road Material and Aggregate

PALMETTO QUARRIES CO. of Columbia, S. C., operates one of the largest quarries in the great granite area of the Carolinas which is so important for producing road material and aggregate at the present time. Its operation is about three miles from Columbia and on the same side of the Saluda river, which makes it easy for trucks to make city deliveries. But the main part of its production goes by rail, all over the state and into Georgia and Florida.

As with practically all the granite quarries of the southeastern states, a high face is carried, holes being put down 160 ft., which puts them 3 ft. below the grade line. Two No. 3½ Keystone drills are employed for this work. In addition there is considerable drilling with tripod drills for which Ingersoll-Rand drills of the X-70 pattern are used. And Jackhamers of the same make are used for secondary shooting.

Although this granite is very hard, it breaks well because of its structure, and holes are set 18 ft. apart and given 18 ft. burden. They are loaded heavily at the bottom. Ordinarily the first 40 ft. is loaded solidly with 60% blasting gelatine. The remainder of the hole is given an intermittent or "broken" loading. Forty per cent gelatine is used for secondary blasting.

The problem in all these deep granite quarries is to raise the material to the crusher with the least expense, and for this purpose both cableways and derricks are in use. Each machine has its advocates. The Palmetto quarry uses both, but T. M. Hanna, the quarry superintendent, said that under the conditions found in this quarry the derricks gave a slightly lower cost. At a neighboring quarry, however, the cableway was found to be cheaper. The cableway used at the Palmetto quarry is a Lidgerwood of standard type carrying 4½-yd. pans. The track cable is an American Steel and Wire Co.'s No. 91 track strand cable, which is not like a rope but like the strand of a rope.

*The plant, with the new trestle, at the right, under construction*

*Main building of the crushing plant*

The whole system of transporting the material was being changed when the quarry was visited to obtain these notes. An incline was being installed of standard gage, 600 ft. long, 350 ft. of which was on a trestle then under construction. This road will connect a hopper at one end of the quarry where the work is now advancing, with a "high line" above the primary crusher bin. Cars will load at the hopper and be pushed up the incline to where they can dump into the bin by a 16-ton steam locomotive. The train will then return by gravity.

The hopper will be loaded by two derricks and it will have sufficient capacity so that the derricks can keep working whether cars are ready or not. This will simplify the system and transfer the rock from the quarry floor to the crusher with the use of considerably less machinery than was formerly employed.

The primary crusher is a No. 20 McCully "Superior" through which everything passes. The discharge then goes to a special 16-in. McCully reduction crusher and then, by a bucket elevator, to a scalping screen with 2¼-in. round holes. This screen is 16 ft. long and of 60-in. diameter. The oversize goes for recrushing to two No. 6 Gates crushers and one No. 27 Weston crusher. The product of these crushers goes by the same elevator back to the scalping screen.

The undersize of the scalping screen is elevated to the sizing screen which is 20 ft. long and of 60-in. diameter. It has 9/16-in., ¾-in., 1¼-in. and 1¾-in. round hole perforations. All the products of this screen (including the oversize, which is through 2¼-in. and on 1¾-in.) are sent to bins, with the exception of the through product of the 9/16-in. holes. This is passed over a Hummer electric vibrating screen with 3/16-in. square mesh holes, making one commercial size and screenings.

This quarry has much more overburden to contend with than many granite quarries, and in places as much as 20 ft. must be removed. This is done by a No. 18 Osgood steam shovel. Strippings are loaded into cars and sent to a waste dump. This heavy overburden is not so serious as it would be

***Loaded cars passing through gate in the levee***

***Cableway at work. The heavy overburden shows above the rock***

***The plant stands on the edge of the quarry and is served by derricks***

in an ordinary limestone quarry, on account of the great height of the face.

One unusual problem that this quarry has to contend with is that of handling surface water. The top of the quarry is not very high above the Saluda river and at times the river has risen sufficiently to have flooded the quarry if it had not been protected. This protection is by levees raised sufficiently high to keep back the highest water that has been known. In one place the railroad tracks that serve the plant have to pass through this levee and here strong concrete abutments have been made and a gate fitted so that the water can be kept out. Of course shipping would have to be suspended if the river should rise sufficiently to require the closing of the gates, but such a rise would stop the cars from running by flooding the track in other places. However, high water periods are several years apart.

***Concrete abutments and gate in the levee by which the quarry is protected from a rise of the river***

The office of the company is at the plant. T. W. Walters of Columbia is president and G. D. Lott is treasurer and general manager in charge of all operations. T. M. Hanna is superintendent.

## Further Investigation of Feldspar

THE composition, results of fineness determination by sieves and air analyses, softening ranges, and true specific gravities of the 19 feldspars used in this investigation were reported in *Technical News Bulletin*, No. 117, January, 1927. Work has since been done on the effect of feldspars on (1) relative glaze fit; (2) mechanical strength, volume shrinkage, and porosity of vitreous and semivitreous bodies; (3) thermal expansion of vitreous and semivitreous bodies.

1. In these tests semivitreous disks were made using the 19 different feldspars as the only variable component. The disks were bisque fired to cone 8, covered with glazes in which the feldspar was the only variable component, and glost fired to cone 6. Several combinations of different bodies and glazes were used, making a total of 365 specimens. Thirty quenchings were made by heating the glazed disks to 200 deg. C. for 20 minutes and quenching in running water at 20 deg. C. The results indicate that a high potash feldspar either in the body or glaze is conducive to crazing. The bodies and glazes containing a feldspar intermediate in $K_2O$-$Na_2O$ content were more resistant to crazing. Included in these tests were bodies and glazes containing two high potash feldspars of almost identical chemical and petrographic analyses and fineness of grain. The group of bodies and glazes containing one of these high-potash feldspars crazed easily, while the group containing the other high-potash feldspar did not craze so easily. Why they should act differently has not yet been determined.

2. These tests were made on vitreous cast burs fired to cone 12 and semivitreous bodies fired to cone 8 using five selected feldspars as follows:

(a) Commercially pure soda feldspar.

(b) Low potash feldspar (Canadian).

(c) Low potash feldspar (domestic blend).

(d) Intermediate $K_2O$-$Na_2O$ content feldspar.

(e) High-potash feldspar.

The specimens used in these tests were 5-in. round bars ⅞ in. in diameter. The rate of heating and cooling was varied as follows:

Burn A. Heat 30 hours; cooled 950—450 deg. C. at 50 deg. per hour.

Burn B. Heat 30 hours; cooled 950—450 deg. C. at 16 deg. per hour.

Burn C. Heat 17 hours; cooled 950—450 deg. C. at 50 deg. per hour.

Burn D. Heat 17 hours; cooled 950—450 deg. C. at 19 deg. per hour.

Results for each feldspar used are tabulated in Table 1 and for each burn in Table 2.

3. Data indicate greater expansion of vitreous bodies containing a soda feldspar, and with a fast heat-fast cool-heat treatment. Expansion data are incomplete for semivitreous bodies.

TABLE 1

| Feldspar Body No. | Vitreous | | Semivitreous | | |
|---|---|---|---|---|---|
| | Volume shrinkage | Strength Ft.lb./in.² | Volume shrinkage | Porosity | Strength Ft.lb./in.² |
| 1 | 36.0% | 7500 | 29.5% | 6.8 | 6500 |
| 2 | 36.3% | 7400 | 28.9% | 10.0 | 5300 |
| 3 | 36.4% | 9200 | 30.5% | 7.1 | 6400 |
| 4 | 37.5% | 8800 | 29.2% | 8.8 | 6000 |
| 5 | 37.2% | 7900 | 28.6% | 8.2 | 6200 |

TABLE 2

| Burn | Vitreous | | Semivitreous | | |
|---|---|---|---|---|---|
| | Volume shrinkage | Strength Ft.lb./in.² | Volume shrinkage | Porosity | Strength Ft.lb./in.² |
| A | 37.1% | 7600 | 27.3% | 9.5 | 6300 |
| B | 35.2% | 7600 | 30.3% | 7.9 | 5900 |
| C | 36.5% | 7800 | 29.1% | 8.9 | 5900 |
| D | 36.7% | 8900 | 30.2% | 8.2 | 6100 |

## Production of Graphite in 1926

THE graphite industry on the whole was more productive in 1926 than it was in 1925, according to a statement by the United States Bureau of Mines, Department of Commerce. The following statistics on production were collected in co-operation with the geological surveys of Alabama, Michigan and Texas. The sales of natural graphite by producers in 1926 were 5145 short tons, valued at $209,592, an increase of 480 tons, or 10%, in quantity, and of $113,231, or 118%, in value, compared with 1925. The increase was in the crystalline variety, amorphous graphite decreasing in both quantity and value. The 1926 sales of amorphous graphite amounted to 2650 short tons (52% of the total graphite), a decrease of 886 tons, or 25%, compared with 1925. The value of the amorphous graphite in 1926 was $30,750, a decrease of 22% compared with 1925. The sales of crystalline graphite in 1926 were 4,989,200 lb., valued at $178,842, an increase of 2,731,950 lb., or 121%, and of $122,121, or 215%, compared with 1925. The quantity and value of crystalline graphite in 1926 were the largest since 1920.

The manufacture of artificial graphite in New York increased considerably—from 12,135,655 lb. in 1925 to 21,163,986 lb. in 1926, or 74%.

*Quarry and lime plant of the Gibsonburg Lime Products Co., Gibsonburg, Ohio*

# New Plant in Ohio Finishing Lime District*

## Experience Gained from 50 Years of Lime Manufacturing Worked into Design of Gibsonburg Lime Products Company Operation

THE past month has seen the entrance of a new producer into the Ohio finishing lime industry—the Gibsonburg Lime Products Co. The new plant of this company at Gibsonburg is interesting because it represents the summation of many years' experience in the manufacture of Ohio dolomitic lime, and because it represents a number of new and rather novel features in lime plant design. It is largely owned by the Zorn family, which for two generations past has been actively connected with the growth and development of the Ohio finishing lime industry.

### *Long Connected with Lime Industry of District*

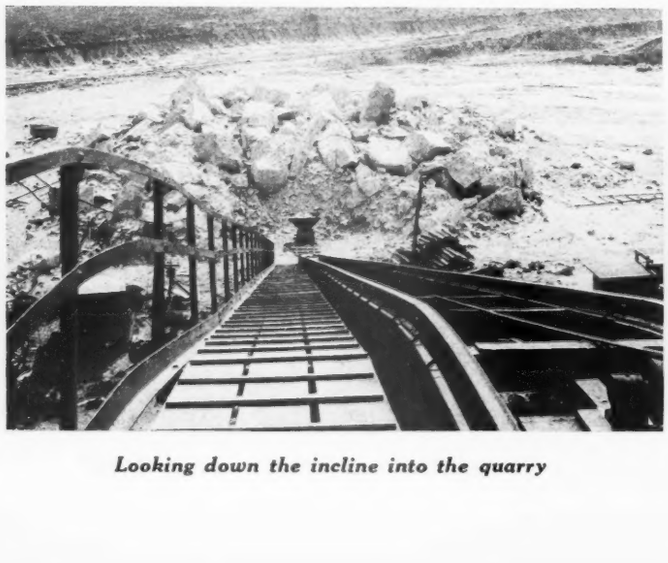
The Zorn family have been pioneer lime manufacturers in the Gibsonburg, Ohio, district since 1876, or over 50 years. At that time, Philip Zorn, father of the present head of the company, Henry Zorn, Adam Hornung and others organized a company to erect a plant on the Stevenson farm. A short time after the plant was in operation the Zorns and Hornungs acquired the interests of the other partners and established the Zorn-Hornung Co., to operate this plant and others purchased from Gibson & Co. and Dr. King. These plants were producers until 1903, when they were abandoned.

This company also installed one of the first German "ring ofens" in the United States at the Beeker farm in 1898, but found it unsatisfactory to operate, so replaced it with patent draw kilns then in use. A few years later, A. H. Lauman, of Pittsburgh, joined the company and the Standard Lime Co. was formed. This company took over the Beeker plant and installed one of the early hydrators, a Lauman, which system is still in use. The plant was sold to the Ohio and Western Lime Co., in 1906, and later became one of the units of the Kelley Island Lime and Transport Co.

After the sale of the Beeker farm plant, the National Mortar and Supply Co. was organized and a plant built at Gibsonburg. The Zorn holdings in this plant were sold in February, 1926, and the proceeds used to construct the present new plant of the Gibsonburg Lime Products Co.

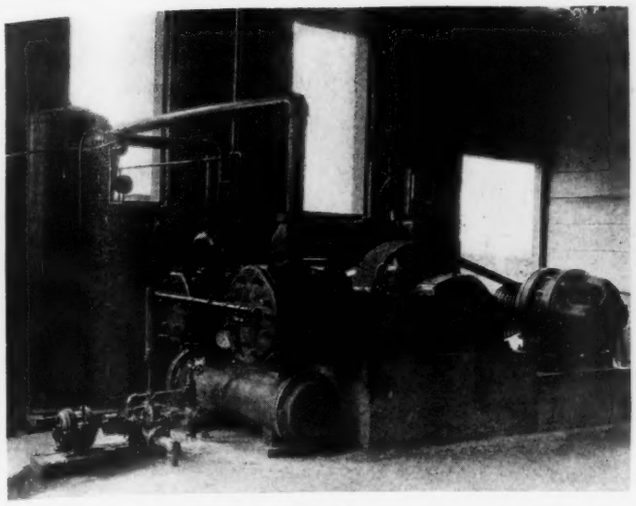
The new plant is the most recent in the Gibsonburg district. It is placed just across the Pennsylvania railroad tracks from the present plant of the Kelley Island Lime and Transport Co., and is on part of the same Beeker farm on which the original plant was located. The experience gained by over half a century of lime manufacturing has been worked into its design to make it one of the most compact and efficient lime plants in the country.

*Rock Products is indebted to *Building Supply News* for some of the illustrations and much of the data used in this article.

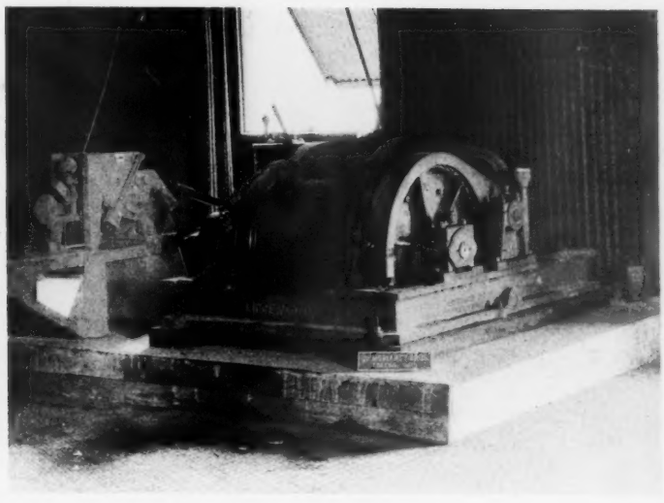


*Looking down the incline into the quarry*

*The eight kilns loaded for burning*

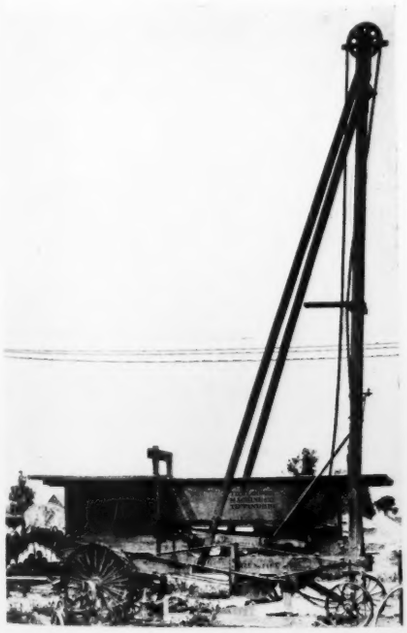


*Two-stage compressor with short center rope drive supplies air for the quarry*



*Single-drum hoist for drawing quarry cars to the tops of the kilns*

Only 30 men are required to operate all departments of the lime plant, which has a daily capacity of about 100 tons of burnt lime. The rock in the quarry is sorted by hand on a piece-work basis. Most of the output will go to making finishing hydrate,



*Well drill working in stripped ground*

but some agricultural and pulverized lime will be produced also.

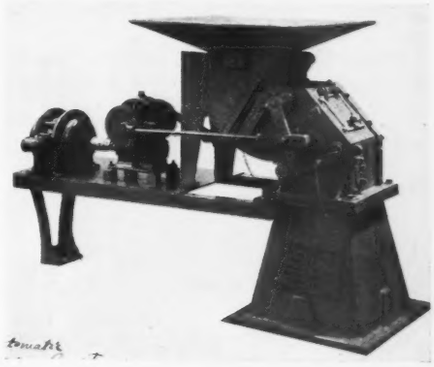
### Quarry

The rock, Niagara dolomite, is of excellent purity and identical in composition with other deposits in the district. An average overburden of about 7 ft. of dirt was first removed, and this was done by a No. 32 Marion electric shovel. The strippings were placed in trains of Koppel cars and hauled by Plymouth locomotives to a railway fill. In opening the quarry, holes were put down in the stripped area by a Loomis "Clipper" drill and loaded with Hercules dynamite. About 15,000 tons of rock were loosened at the first shot. The broken rock was hand-picked, stone from 4 to 9 in. being loaded on Koppel cars and drawn up the short quarry incline to the tops of the kilns by a Lidgerwood single-drum hoist. A crusher and screening plant will be installed later to separate spalls to the desired sizes.

### Kiln Operation

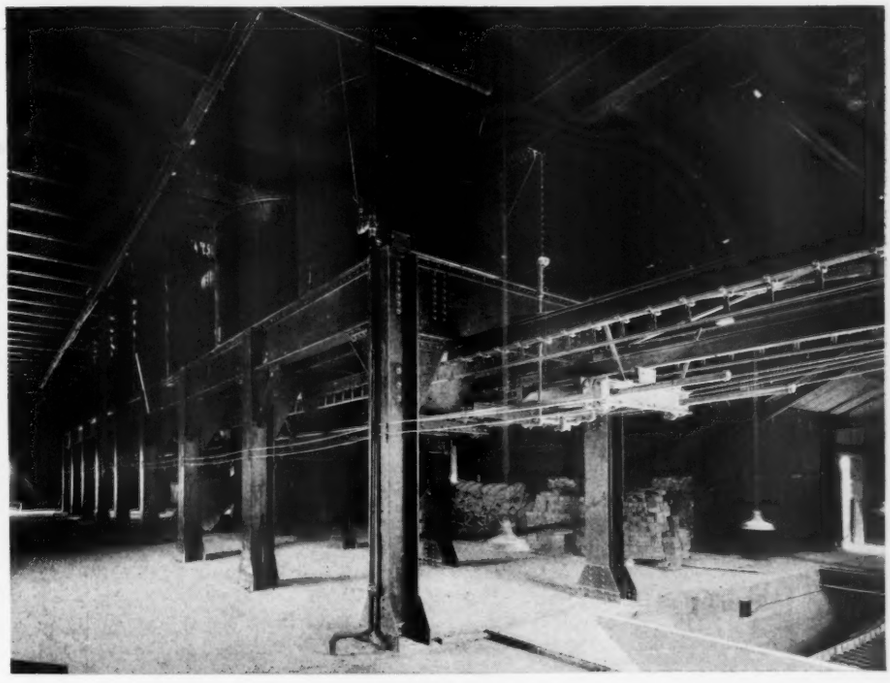
The kilns, of which there are eight, are 11 ft. in diameter, 24 ft. high, with a 4-ft. steel cribbing over the entire battery. They are all standard Arnold kilns, designed by Arnold & Weigel, Woodville, Ohio, and lined with Harbison-Walker and Toledo Plaster and Supply Co. firebrick.

External firing is used, each kiln being

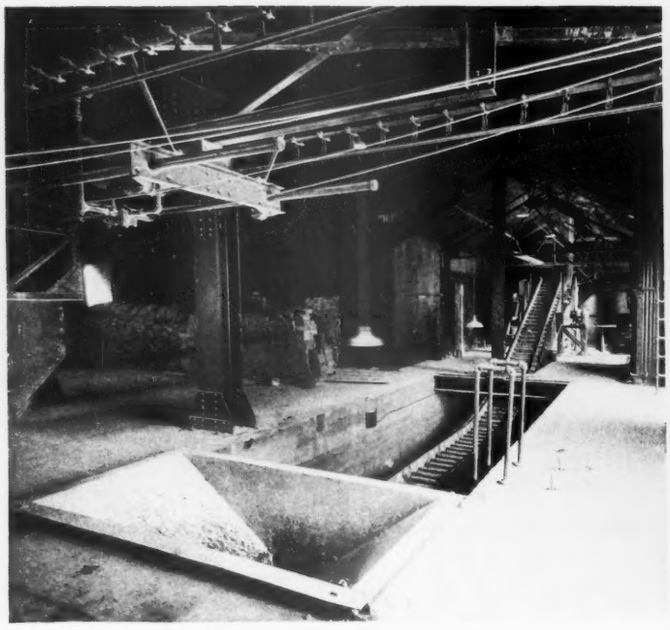


*Modified design of automatic stoker*

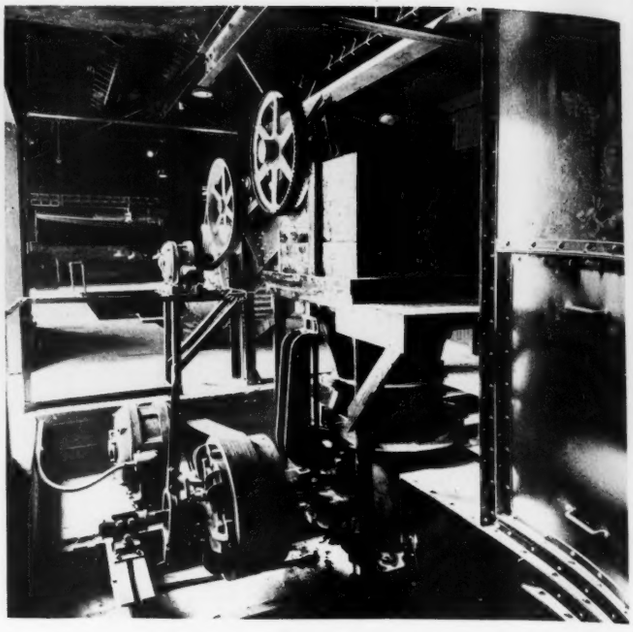
provided with two Ward stokers (one for each firebox). The Ward stoker, manufac-



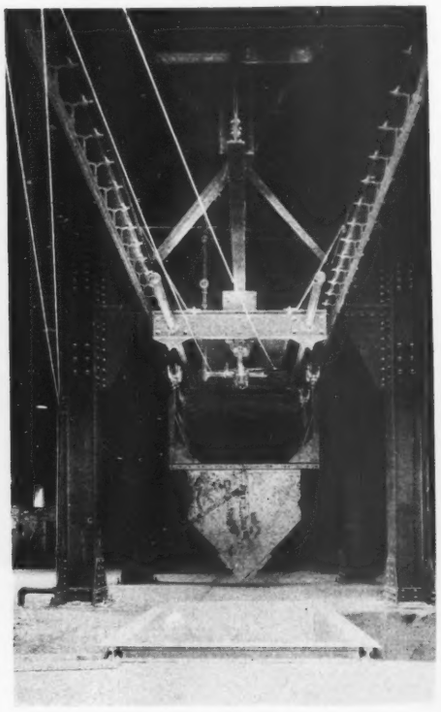
*Interior of the lime plant. The burned lime is drawn from the kilns into the bucket running on a duo-rail alongside the kiln battery*



*Lime hopper and pan conveyor which carries the burned lump lime to the crusher*



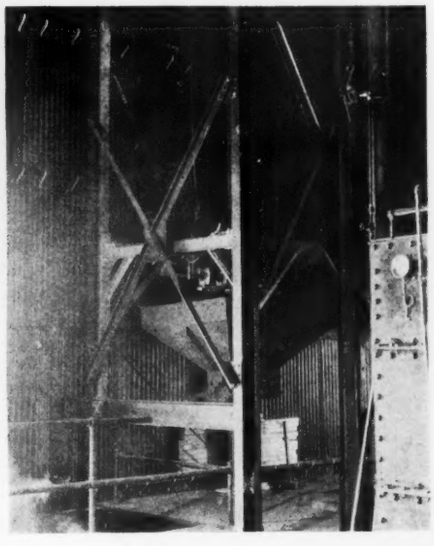
*Gyratory crusher which crushes the lump lime and the storage elevator*



*Bucket discharging lump lime into hopper over pan conveyor*

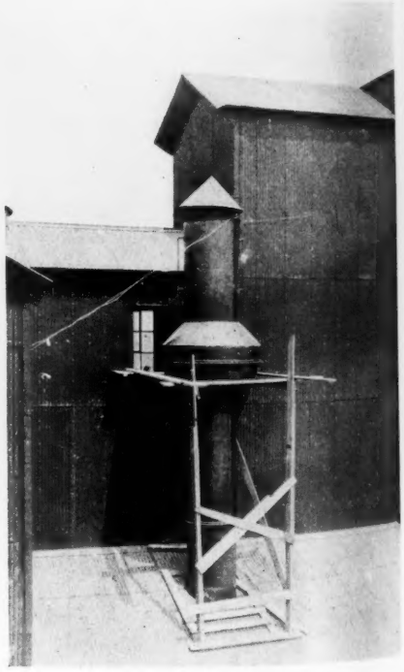
tured by Arnold & Weigel, is a comparatively recent development in the industry. Inasmuch as its operation was described in Rock Products, December 25, 1926, issue, it is sufficient to say that the device provides an automatic and regulated coal feed at a uniform rate to the fireboxes. The stokers are operated by individual ¾-hp. Allis-Chalmers electric motors. With these kilns, the poke doors are opened only at drawing periods, so admittance of excess air is kept at a minimum. Steam for the fireboxes is supplied from a 100-hp. Brownell boiler equipped with Worthington feed water pumps. An Ingersoll-Rand two-stage compressor driven by a 50-hp. Allis-Chalmers motor through a Texrope drive is used to supply compressed air for various needs.

A gas coal from Harlan, Ky., is used as fuel. This is received on an outside track, dumped into a bin and carried by pan conveyor and elevator to storage pits on the firing floor. All the conveyors and elevators in the plant were furnished by the Union Chain and Manufacturing Co., Sandusky, Ohio. From the bottom of the storage bins, coal is carried to the stokers by a one-ton steel bucket running on an overhead monorail made by the Louden Machinery Co., Fairfield, Iowa. Each stoker holds one ton of coal, the capacity of the bucket feeder.

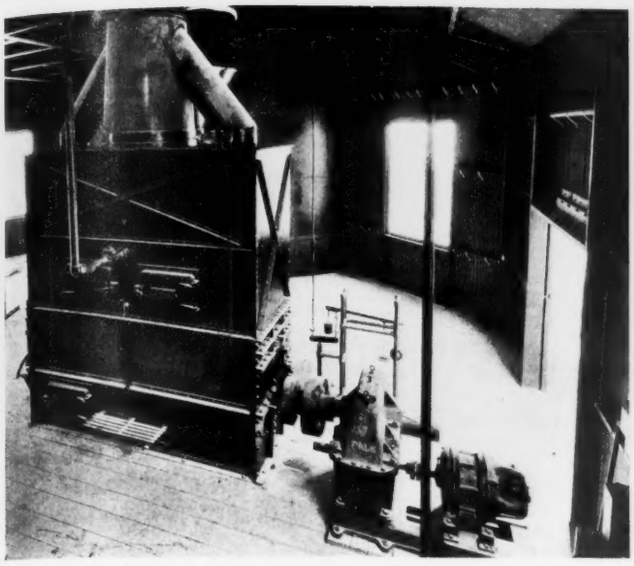


*Coal feeder for stokers*

Drawing is accomplished by pneumatically operated draw shears, the burned lime dropping from the coolers to a specially built hopper-bottom steel car running on a double-track overhead trolley. The car and trolley were built by the Louden Machinery Co. The contents of the car are discharged at one end of the kiln battery, on a slow-moving pan conveyor, where deleterious materials are removed by hand and the sorted lime allowed to pass to a Sturtevant No. 2 gyratory set to crush to ½-in. size for the hydrator. The crusher is driven by a 25-hp. Allis-Chalmers roller-bearing electric motor



*Dust collector over the hydrator*



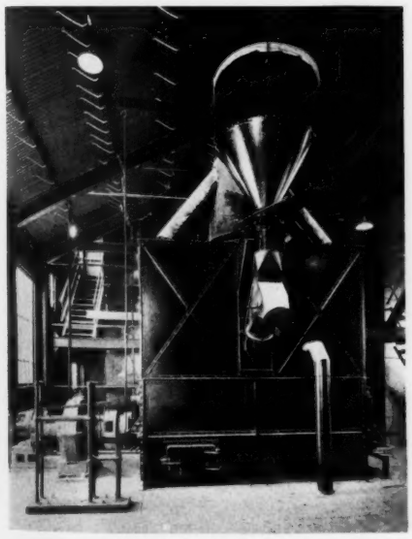
*Front view of batch hydrator showing the drive*

*Rear of kiln battery showing automatic stokers in position*

through a Texrope (multiple-rope) drive.

### *Hydration*

After crushing, the lime is elevated to a sealed ground-lime storage bin of 600 tons capacity, from which it is drawn to the Weber hydrator by a screw conveyor. The hydrator, furnished by Arnold & Weigel, is operated by a 15-hp. electric motor working through a Falk herringbone speed reducer. Lime is admitted to the hydrator through a weigh hopper at one side, while a measured



*Rear of hydrator showing the blanked off connection to which another hydrator is soon to be connected*

amount of water is sprayed over it from pipes inside the hydrator. The mass is continually agitated to insure uniformity of hydration by paddles placed at the bottom of the machine. The steam generated in the hydration is used to dry the hydrate and then passes out through a stack to a specially designed dust collector. The unit collector furnished by Raymond Bros. Impact Pulverizer Co. is a new development, tried for the first time at this plant. A cold water spray is trained on the steam and lime dust in the collector; the steam is condensed and precipitated as water, carrying the lime particles with it to the bottom of the collector, where a return feed is provided to bring the lime particles and water back to the hydrator. The hydrator is a 1-ton batch machine and from four to five batches an hour are maintained, thus giving the plant ample capacity. Four hydrators are contemplated in the final design.

The hydrated lime is discharged from the hydrator to a hopper underneath feeding a Raymond feeder delivering to storage conveyors. All the bins and hoppers in the plant are equipped with these feeders. The storage conveyors carry the hydrate to a large curing bin of about 800 tons capacity. This bulk-storage bin is the only storage of the plant, no sack storage being provided. This is because the company has adopted a policy of finishing and sacking lime on orders and placing the sacked product on the cars for immediate delivery, thus assuring a fresh lime to its customers.

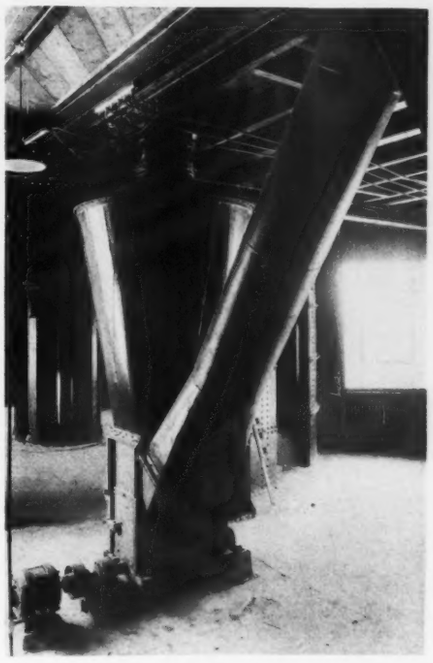
### *Finishing and Sacking*

The finishing machinery is located between the seasoning bin and bagging machines. The mill is a Raymond No. 3 automatic pulverizer equipped with an air separator and dust collector of the usual canvas-tube type. The finishing hydrate is carried by the air current of the separator to bagging bins over the packing machines, on the loading platform alongside the railroad siding. The packers are 4-spout Bates and Bates valve bags are used to ship the product. All shipments are made in 50-lb. sacks.

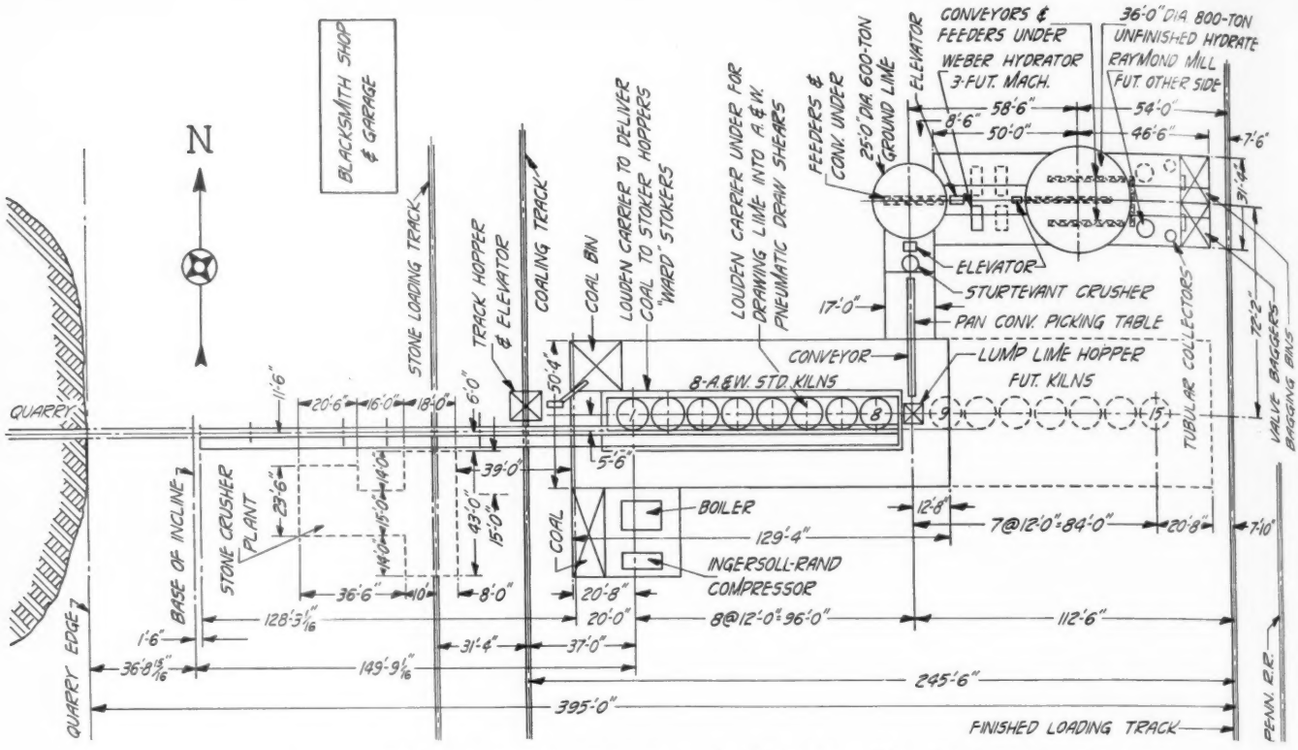
The plant was designed by Arnold & Weigel, Woodville, Ohio, and construction was under the supervision of F. H. Rutchow, vice-president of the company. It is entirely of structural steel and concrete, with corrugated protected metal. This metal is coated on both sides with an asphalt-asbestos compound designed to withstand the destructive action of the kiln gases and other elements. It was furnished by H. H. Robertson Co. and the structural steel was supplied by the Bellefontaine Bridge and Steel Co., Bellefontaine, Ohio. The company carries no fire insurance, acting on the basis that the risk from fire is almost entirely eliminated because of the fire-resistive construction of the plant.

### *Complete Electrical Operation*

The entire plant is electrically operated, power being purchased from the Lake Erie Power and Light Co. This comes in at



*Automatic pulverizer which prepares the finished hydrate*




***Ground plan showing location of equipment at the Gibsonburg Lime Products Co. plant***

33,000-v. and is stepped down to 2300-v. at a point about 1500 ft. from the plant. From here the current is carried by underground lead cable to the plant, where it is again stepped down to the 440-v. used throughout. Electrical supplies other than motors were furnished by the Lake States General Electric Co. and the F. Bissell Co.

### *Management*

The Gibsonburg Lime Products Co. is owned almost entirely by the Zorn family, three-fourths of the stock being held by them. F. W. Zorn is president; Fred H. Rutchow, vice-president and general manager; Corinne C. Zorn, secretary; C. H. Zorn, treasurer, and R. Zorn, assistant secretary. The company will market its lime products, under familiar brand names.

## North Carolina Pyrophyllite Developments

DEVELOPMENTS at the two principal regions of pyrophyllite mining in North Carolina are making way for a larger volume of output from what mineralogists declare to be the only commercial deposits in the United States.

According to word received by the North Carolina geological department, the Standard Mineral Co. at Hemp has been taken over by the R. T. Vanderbilt Co., which plans a greatly enlarged output.

New machinery is being installed at the plant of the United Talc and Crayon Co. at Glendon, and operations of the plant in turning out powdered materials has started.

The first carload shipment since the company has come under new ownership was made recently from Glendon and the management expects to maintain a good rate of operations. The new machines will furnish a maximum of 40 tons of powdered pyrophyllite daily for the paper and rubber trades, and machinery to be installed soon will have a capacity of between 10 and 20 tons daily for the roofing trade, where it is used chiefly for dusting between shingles to prevent sticking.

Besides the pulverized materials, the company is marketing a large number of pencils. The daily capacity of the machines is 200 gross.—*Natural Resources.*

[Pyrophyllite is sometimes called French chalk and pencil stone. It is one of the kaolin minerals and has been imported from China and European countries.—Ed.]

***General view of the new plant of the Gibsonburg Lime Products Co., Gibsonburg, Ohio***

# Effect of Velocity on Pump Guarantees

By George H. Gibson
Consulting Engineer, New York

THE efficiency of a machine which has for its purpose the transfer or transformation of energy is ordinarily defined as the ratio of the energy output to the energy input. The energy input of a centrifugal pump is the energy applied to turning the shaft, while the energy output is calculated as the volume of fluid handled multiplied by the increase in pressure generated, or as the weight of fluid multiplied by the head pumped against. The total mechanical energy of a fluid, however, includes pressure head, elevation head and velocity head, all of which items must be taken into account.

The gain in pressure is readily measured by means of pressure gages connected to the inlet and outlet nozzles, respectively. Any difference between the elevations of the pressure responsive parts of the two pressure gages must be taken into account as elevation head. This is easily measured, or can be eliminated from the calculation by locating the two gages at the same level.

The remaining item, velocity head, is sometimes overlooked and sometimes misunderstood by the pump user, and is the subject of the present discussion. Velocity head is the vertical distance in which a freely falling body would gain the velocity being considered, and is equal numerically to the velocity in feet per second squared, divided by twice the acceleration of gravity in feet per second, or in algebraical symbols, $\frac{V^2}{2g}$.

The velocity of the fluid as it enters the suction nozzle or leaves the discharge nozzle of a centrifugal pump is readily calculated by dividing the flow in cubic feet per second by the cross-sectional flow area in square feet. If the areas of the suction and discharge nozzles are equal, there is no correction for velocity head, but if one is larger than the other, the difference in velocity head is added to, or subtracted from, the pressure head developed by the pump, accordingly as the discharge nozzle is smaller or larger, respectively, than the suction nozzle. The rule given in the "Standards of the Hydraulic Society reads:

"If the discharge pipe is of smaller diameter than the suction pipe, which is often the case, then it will be necessary to add to the Total Head, as shown by the gages, the difference in Velocity Head between that of the discharge and that of the suction pipe at the points where gages are connected. If the discharge pipe is larger than the suction pipe, the difference in Velocity Head must be subtracted from the Total Head."

From point of view of energy transferred to the water in the pump, the theory of this rule is entirely correct, but it can lead to considerable error in evaluating the practical utility of a pump. The piping connections should be considered, as will appear from the following example:

Suppose that bids are asked on a pump of 18-in. nominal size to deliver 9000 gal. per minute against 35-ft. head, and that one manufacturer, figuring on a pump with 18-in. suction nozzle and 18-in. discharge nozzle, guarantees 82% efficiency, while another manufacturer offering a pump having an 18-in. suction nozzle and a 16-in. discharge nozzle guarantees 82.5% efficiency. Which is the better pump, other things being equal? It is assumed that on test each pump will show exactly the efficiency guaranteed. The pump credited with the higher efficiency, however, gets credit for its efficiency by virture of a velocity head correction of

$$\left(\frac{14.4}{64.4}\right)^2 - \left(\frac{11.4}{64.4}\right)^2 = 1.2 \text{ ft.},$$

11.4 ft. per second being the velocity in the suction nozzle and 14.4 ft. per second the velocity in the discharge nozzle, and the question before us is, Does the customer receive the full benefit of this velocity head?

If there is space enough to install a straight 16x18-in. increaser, from 60% to 70% of the velocity of the water as it leaves the pump may be converted into useful pressure head. It will not in general do to have the entire discharge piping of 16-in. diameter, as that would lead to excessive pipe friction; in fact, in practically all cases it should be larger than 18 in. Thirty per cent of 1.2 ft. is .36 ft., so that there will still be a net loss of about 1% of the total head, and the overall efficiency will be 99% of 82.5, or only 81.67%, as compared with the 82% guaranted for the pump having the 18-in. discharge nozzle.

In probably 95 cases out of 100, moreover, the pump will be installed with the discharge flange bolted directly to an elbow to connect with a pipe extending vertically upward to the ceiling or downward through the floor. The friction of a 90 deg. ell is commonly figured as equal to that of 50 ft. of straight pipe, on which basis, the pump with the 18-in. discharge nozzle will have a loss through the elbow of 1.63 ft., while the pump with the 16-in. discharge nozzle will have a loss through the elbow of 2.85 ft. The loss with a 16x18-in. increasing ell would be almost as great, because there would be practically no conversion of velocity to pressure in the elbow. There is accordingly an increased loss due to the use of the 16-in. discharge nozzle of 2.85 ft. — 1.63 ft. = 1.22 ft., or 3.48% of the total head developed. Based upon readings taken at the outlet of the ell, the pump having the 18-in. discharge nozzle has a useful efficiency of

$$\frac{35 - 1.63}{35} \times .82 = 78\%,$$

while the pump with the 16-in. discharge nozzle has a useful efficiency of only

$$\frac{35 - 2.85}{35} \times 82.5 = 75.7\%.$$

The customer similarly pays an excessive price for a small discharge nozzle where a check valve is bolted directly to the pump flange, as is frequently done. At high velocities, friction losses through check valves are considerable. The friction through a 16-in. valve at 14.4 ft. per second velocity may, depending upon design, be as much as 6.1 ft., and through an 18-in. valve at 11.4 ft. per second velocity, 3.8 ft., or an additional loss through the 16-in. valve of 6.1—3.8=2.3 ft. Therefore, based upon the head remaining at the discharge from the check valve, the 18-in. discharge nozzle pump will show an efficiency of

$$\frac{35 - 3.8}{35} \times .82 = 73.1\%,$$

while the 16-in. discharge nozzle pump will show

$$\frac{35 - 6.1}{35} \times 82.5 = 68.2\%$$

or about 7% lower useful output than the 18-in. discharge nozzle pump.

In other words, the customer should consider the complete installation, including the piping arrangement which will be used with the pump, when comparing efficiencies, and he should bear in mind that a pump having the proper size of nozzle may give a greater useful effect, even though its guaranteed efficiency is lower. This applies particularly to low head pumps, where the velocity head constitutes an appreciable part of the total head.

As the velocity in the pump volute is always much higher than in the discharge nozzle, one of the problems of the pump designer is to convert this high velocity into pressure as efficiently as possible; but it is easier for him to leave the velocity high, clear up to the discharge nozzle, especially if he can persuade the user to give him credit for the entire gain in velocity head between suction and discharge nozzles.

The better showing made by the pump having a small discharge nozzle will be more than offset by loss in the piping unless an efficient straight increaser is put in between the pump discharge flange and the pipe line. Unless this could be done, the pump with 18-in. discharge nozzle in the above example would be much preferable.

In any event, a pump which has a discharge nozzle smaller than the suction nozzle should not be given full credit for velocity head in comparing it with a pump having both nozzles of the same size, since it is impossible to convert 100% of the velocity into pressure, even with the best piping layout.

# Hints and Helps for Superintendents

## Bin Details

THE reinforced-concrete bins of the Dolomite Products Co.'s new plant near Rochester, N. Y. (described in ROCK PRODUCTS, August 6, 1927, issue) have some very interesting details. The bins are tall and narrow, but have a total capacity of 3000 tons of stone in seven sizes. Each bin has five discharge gates. A center line of columns, or posts, divides the line of bins into a truck-loading passage or driveway and a railway car-loading passage or track. A row of gates is provided in the bins in the center of each passageway. These gates are the hinged-jaw type operated from an elevated runway, as shown in one of the views.

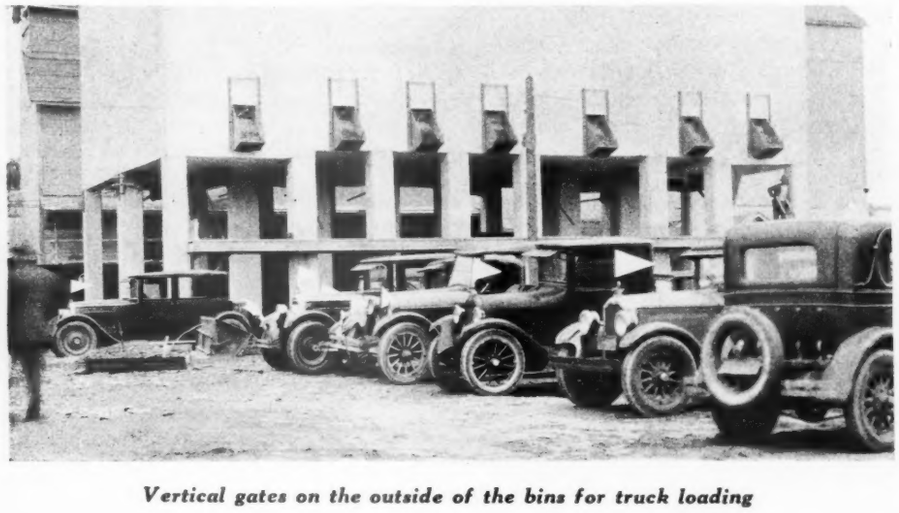
*Truck loading passage underneath concrete bins*

In addition there are vertical gates on the outside of each bin as shown in the other view. In the view shown these are for truck loading, but there is a similar row for car loading on the opposite side.

Besides these four rows of gates for direct loading of cars or trucks, there is a row of smaller gates, as shown in the first view, near the center line of columns. These are to discharge on a belt conveyor, hung from the bottoms of the bins by the ties shown in the concrete. These gates, and the conveyor, will provide for any mixture of aggregates, from any or all the bins, as may be desired. The conveyor had not been installed, of course, when these views were taken.

The total width of the bin structure is 40 ft., yet provision has been made for loading two rows of railway cars, and two rows of trucks, simultaneously, with clearances in the driveway and track under the structure much more than is common practice.

John Odenbach is president, and Harvey N. Clark is superintendent, of the Dolomite Products Co.



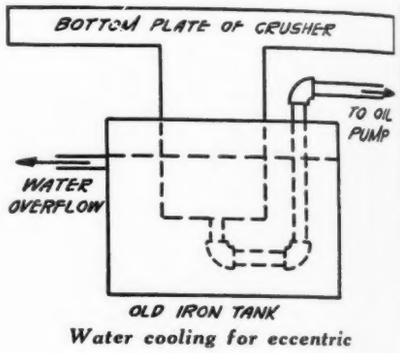
*Vertical gates on the outside of the bins for truck loading*

## Gyratory Crusher Eccentric Kept Cool by Running Water

By W. L. HOME
Consulting Engineer, Pine Plains, N. Y.

A CRUSHER which it seems nobody could find the trouble with and which had burned up innumerable eccentrics in its three years of operation was finally cooled down and kept cool by the method shown.

On this crusher was an external pump, pumping from the bottom of the oil well to a point at the top of the eccentric. After running the crusher this pipe line would soon become so hot that you could not touch it with your hand. The oil had to be changed frequently, the oil consumption was tremendous, and eternal vigilance was necessary to operate the crusher at all. Being unable to find the exact cause for this excessive heating, it was decided to take the heat away from the crusher faster than it was generated. To do this it was necessary to rearrange the oil lines as shown and to make them absolutely tight. Next an old iron tank with an overflow near the top was raised up around the oil well and oil pipes. The overflow was connected so as to drain outside the plant and cold water piped to the tank and allowed to run at all times. From that time on eccentrics gave no more than ordinary trouble.




*Water cooling for eccentric*

## Water for Gravel Screens

IN the issue of August 6, reference was made to the water supply of the plant of the Buffalo Gravel Corp., which, from its briefness, seems to have puzzled some of the readers of ROCK PRODUCTS who have written to H. A. Stelley, the manager of the plant, for more detailed information. As the system of pumping employed is somewhat unusual, and as it is working very well, the full description as given by Mr. Stelley is printed in this department:

"Water for washing is taken directly from the Niagara river, using two No. 6 Gould centrifugal pumps, each delivering 1100 gallons per minute at 156-ft. head and each driven by 50-hp. General Electric squirrel cage motor at 1500 r.p.m. Each of these pumps has an 8-in. dia. suction pipe connected to a 12-in. dia. suction pipe, which leads from the river about 80 ft. away. Each pump has a 6-in. dia. discharge connected to a 10-in. discharge line leading to the top of the plant, about 250 ft. away. From this 10-in. pipe the water is distributed in the regular way to the two sets of screens, and to the hopper above the screens at the end of the belt conveyor delivering the material to the plant.

"The two centrifugal pumps are primed by the use of one 6x12 Gould double acting pump driven by 5-hp. motor."

## How to Figure Drum Capacities

OFTENTIMES it is necessary for the plant operating head to know the drum capacity of a hoist. A recent bulletin brought out by the Novo Engine Co. contains the following method which is quite simple and applicable to all sizes of drums with different rope diameters:

Add the depth of the flange "H" (in inches) to the diameter of the drum "D" (in inches) and multiply the answer by the depth of the flange "H" (in inches). Multiply this result by the length of drum "L" (between flanges) in inches. Multiply this result by figure in the column opposite rope size, in table below. The answer will be the rope capacity in feet.

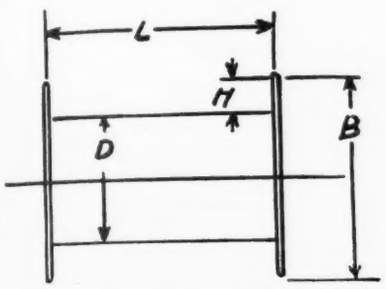



*Diagram illustrating method of figuring drum capacities*

Example:

| | |
|---|---|
| Depth of flange | 5 in. |
| Diameter of drum | 12 in. |
| Length of drum | 16 in. |
| Size of rope | ½ in. |

5 + 12 = 17
17 × 5 = 85
85 × 16 = 1360
1360 × 1.05 = 1428 ft. of ½-in. rope

Formula: (H + D) H × L × multiplier

| Size of rope diam. in inches | Multiplier | Size of rope diam. in inches | Multiplier |
|---|---|---|---|
| ¼ | 4.16 | 1⅜ | .138 |
| ⅜ | 1.86 | 1½ | .116 |
| 7/16 | 1.37 | 1⅝ | .099 |
| ½ | 1.05 | 1¾ | .085 |
| 9/16 | .828 | 1⅞ | .074 |
| ⅝ | .672 | 2 | .066 |
| ¾ | .465 | 2⅛ | .058 |
| ⅞ | .342 | 2⅜ | .046 |
| 1 | .262 | 2½ | .042 |
| 1¼ | .167 | | |
| 1⅛ | .207 | 2¼ | .052 |

## Simple Method of Measuring the Velocity of a River

THE Geological Survey, Department of the Interior, has devised an easy method of determining the approximate flow of streams or small rivers, where regular river-measuring instruments are not available. The method described below is considered useful under such conditions.

To ascertain the velocity of the stream choose a place where the channel is straight for 100 or if possible 200 ft. and where it has a nearly constant width and depth and smooth current. Lay off on the bank the center 50 or 100 ft. of the straight reach of the stream, marking each end. Then allow small chips to float down the stream, noting the time required for these to traverse the distance laid off on the bank.

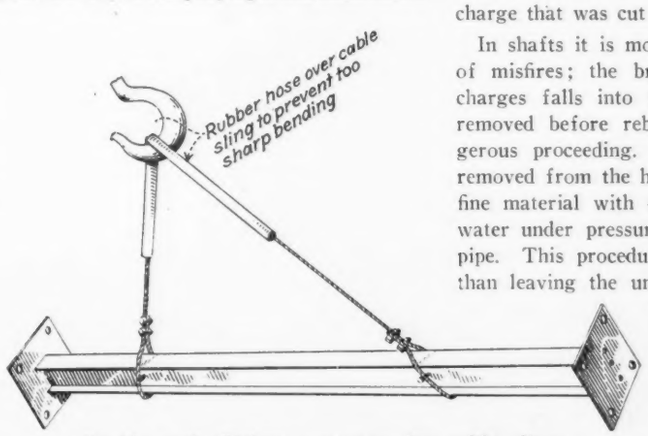
The surface velocity in feet per second is obtained by dividing the distance in feet passed over by the chips by the time in seconds it takes them to travel this distance. The average result of several such tests, made at different positions from bank to bank, will give the mean or average surface velocity of the stream. This result multiplied by 0.8 gives very nearly the average velocity of the entire flow of the stream. This is the first step.

To obtain the area of the cross section of the stream, stretch a tape from shore to shore and take the depth of the stream at short intervals—two or five feet. The average of these depths may be assumed as the average depth of the stream at this point. This average in feet multiplied by the total width in feet will give the area of the cross section of the stream in square feet.

The volume of the discharge of the stream is now found by multiplying this cross-section figure by the average velocity, feet per second, as obtained by the chip measurements, the result being the discharge in second-feet, or, in other words, the number of cubic feet of water flowing past the point of measurement each second.

## Protection for Cable Slings

A SIMPLE and efficient protector for wire rope slings, where they are used over hooks, is described by Charles Labbe in a recent issue of *Engineering and Mining Journal*. The accompanying illustration shows how the wire rope can be protected from injury and from too sharp a bend by slipping over it a rubber sleeve. This sleeve can be made from a piece of heavy rubber hose which has been discarded. The hose section is placed on the wire before the ends are looped and is sufficiently short to allow easy inspection and slipping along to where it is needed.




***Simple and efficient protector for cable slings***

## Unexploded Charges in Drill Holes

SOME gelatin dynamites become insensitive with age, and in consequence occasionally a part of a charge fails to explode and remains in the bottom of a drill hole, states the Bureau of Mines, Department of Commerce, in Technical Paper 400, recently issued. When this happens the unexploded part of the charge is detected only by a close inspection of the face, for its presence is not indicated by a count of the exploding charges of the round or by the fuse sticking from the hole. In hard ground where the rounds do not always break bottom, a stick or two of explosives left in the bottom of a hole may be overlooked; although drilling or picking into such explosive does not always cause it to detonate, a number of serious accidents have occurred from this cause. An explosive insensitive to detonation by ordinary detonators is always a source of danger when used underground.

Explosive left in a hole because the outer part of the charge was cut off by preceding shots is more dangerous than explosive left because it was too insensitive to detonate with the rest of the charge. There is a likelihood that a detonator may be in the charge that was cut off.

In shafts it is more difficult to take care of misfires; the broken rock from other charges falls into the holes and must be removed before reblasting—always a dangerous proceeding. Generally the rock is removed from the holes by blowing out the fine material with compressed air or with water under pressure introduced through a pipe. This procedure seems less hazardous than leaving the unexploded charge in the hole and drilling around it. It would seem to be good practice to use clay stemming in the form of cartridges in all "down" holes, because after a misfire the clay could be removed more safely.

The general practice is to blast all missed holes or unexploded portions of charges whenever found before any drilling or picking down is done at the face. In the past, accidents have occurred by removing unexploded charges from drill holes, but this practice is largely abandoned, and the safety rules of most mines prohibit it.

# Hydraulic or Estrich Gypsum for Floors*

## Some Points on the Properties, Application and Uses of Estrich Gypsum as an Interior Building Material

By H. and E. Borgardts
Manufacturers of Gypsum Products, Walkenried (Harz), Germany

WITH regard to the use of estrich or flooring gypsum, it should be impressed from the start, that gypsum floors can be laid *only* by competent parties. It is recommended to cover the laying of gypsum floors in separate specifications, rather than to incorporate it in the specifications for other gypsum or stucco work. This is justified sufficiently by the fact that a special kind of gypsum is used for this purpose—dehydrated gypsum—whose properties differ considerably from those of the gypsum in the form of plaster of paris commonly used for plaster and stucco.

As a rule, in Germany the gypsum manufacturers execute the laying of gypsum floors, or at least provide competent foremen able to supervise such work.

### *Preparation of the Flooring Surface*

The surface on which a gypsum floor is laid deserves especial attention. A wooden surface is permissible only when it is covered with asphalt paper or "Rubberoid," or with a layer of moistened gravel, sand or cinders of not less than 3 cm. (1.2 in.) in thickness. Before applying the gypsum the bottom surface is smoothed, moistened and tamped. When concrete or brick form the bottom surface, they should be moistened, as otherwise the water required for the hardening of gypsum becomes rapidly absorbed by the bottom surface, resulting in cracks and reduction of its otherwise satisfactory hardness.

Rooms, in which gypsum floors are to be laid, should be protected from drafts and frost, as on cement or other stucco jobs. During freezing weather these rooms should be heated and kept at uniform temperatures.

A gypsum coat 3 cm. (1.2 in.) thick is laid on the base. Only dehydrated, dead-burned gypsum can be used in laying gypsum floors. It should not be confused with plaster of paris commonly used for surface finishing. The latter is heated to low temperatures up to about 185 deg. C. in the course of its manufacture and still contains some chemically combined water (up to about 7%). The entirely dehydrated gypsum is subjected to temperatures of over 1000 deg. C. and is completely burned. A floor of plaster of paris would be a complete failure on account of its low hardness. The importance of specifying dead-burned gypsum cannot be over-emphasized.

*Translated from original of H. and E. Borgardts, Walkenried, Germany, by M. A. Corbin.

### *Mixing and Placing*

The mixing of gypsum requires skillful and reliable workmen, as does the mixing of all other surface coats. Rectangular boxes of galvanized iron, 0.80 m. (2 ft. 7 in.) wide and 0.40 to 0.50 m. (about 1½ ft.) high, have proven satisfactory for this purpose. These should be reinforced by flats or angles and provided with handles at the upper edge. Boxes of this size insure adequate working of the gypsum, which is impossible in smaller containers. The gypsum is gradually added by shaking the shovel. The box should be half filled with water. Gypsum is added until it projects out of the water. After a time, during which it becomes completely saturated with water, the gypsum is mixed vigorously. A good gypsum will not form clumps during working. It is recommended to proceed by mixing several boxes at the same time. The working of the gypsum is accomplished by means of tools such as used in mixing lime. Laying of floors in large rooms necessitates the use of two boxes. While one is being emptied, fresh gypsum mortar is mixed in the other.

In applying the gypsum paste a reliable workman should remain at the mixing box and continue the mixing until all of its contents is used up. If this is neglected or carried out unsatisfactorily, water will separate from the mortar, as in the case of all other mortars, so that the first third of the contents may be normal, the second may have too little and the third too much water. Under such conditions, the gypsum coat cannot harden uniformly.

### *Surface Should Be Moist*

The pouring or depositing requires sufficient moistening of the floor surface and of the walls, which come in contact with the gypsum coat, as otherwise the gypsum will lose its moisture too rapidly and, as mentioned above, its hardness will be impaired. The sand base should be tamped evenly without any depressions. This is required to produce uniform thickness of the gypsum coat so that in tapping it the same sound should be heard at all points of the surface. A well-laid floor should have a clear and hard sound. If it seems to be hollow in places, this is a proof of either insufficient tamping or untrue bottom surface.

After this preliminary work is completed, wooden lath is placed on the floor at intervals of 1 m. (39 in.) and the pouring of the gypsum mortar begins. The lath should project 1 cm. (0.4 in.) above the desired floor surface. The gypsum surface is leveled, the lath removed and the grooves filled in with the same mortar, so that an even surface results. An ordinary tin pail is most suitable for gypsum work. A good gypsum coat should remain soft for several hours, during which it gives off some of its water, which collects on the surface and is absorbed again later. The pasty mortar is applied uniformly to thicknesses of 3 to 5 cm. (1.2 to 2 in.) is evened and smoothed. This is done by means of a float, which may be covered with galvanized iron on one side for better wear. After a little training, a workman should learn to level a surface with only one lath remaining in place and by using the freshly placed surface on the other side, without injuring the floor. To provide better bond between two adjoining layers, the layer first placed is provided with projections on the side (called dragon

### *Editors' Note*

***THIS article was contributed at the editor's request, in hopes of eliciting some information on the manufacture of estrich gypsum (hard burnt or hydraulic gypsum). It gives the most up-to-date information available on the application and uses of this gypsum product, about which so little is known in this country.***

***Why hydraulic gypsum has not been manufactured in this country we do not know, for it seems to have special advantages for certain purposes. In Europe, we understand, it is manufactured very much as is lime—that is burned in chunks in shaft kilns. It is then pulverized.***

***The calcining process involves the conversion of some of the gypsum or calcium sulphate ($CaSO_4$) into lime or calcium oxide ($CaO$). It is believed that it is this lime content which gives the material its peculiar properties.***

***To those gypsum enthusiasts who foresee the construction of dwelling houses entirely of gypsum products, the manufacture and use of hydraulic, or estrich gypsum should prove interesting. — The Editors.***

teeth) for greater area of contact.

Tamping of gypsum begins when it has hardened sufficiently to show but a slight depression under the thumb. The tamper should not stand directly on the floor surface. Different kinds of wooden or steel tampers are used. A long steel bar, which permits the workmen to tamp the surface without excessive bending, appears best adapted. The floor is tamped until water appears on the surface. The tamped surface is then rubbed with an ordinary rubbing board and is then smoothed with a flexible steel trowel. The gypsum floor then remains undisturbed for some time and is protected from too rapid drying. In hot and exceptionally dry rooms the floor should be sprinkled once or twice at intervals of two to three days with an ordinary sprinkling can. Air currents should be avoided and all windows and doors of the room should be kept closed.

#### *Use of Admixtures*

In localities where freight charges are high and considerations of economy urge the use of admixtures, the latter should not exceed more than one-third of the quantity of gypsum (by volume). Only clean, sharp sand and slag, preferably ground, which has been exposed to air for some time shall be used. The mixing of gypsum with these materials should be done with great care, as otherwise there is the danger of certain sections of the floor remaining soft and not hardening uniformly. In general, the use of pure gypsum is to be preferred to insure good results. In all cases when admixtures are used in gypsum floors, the responsible contractor should communicate with the gypsum manufacturers and secure their approval of the mixing proportions and of the admixture, as otherwise they could not guarantee satisfactory results.

#### *New Quick-Hardening Method*

Aside from this old method, a new method has come into use recently, which is called the tamping method. One part by volume of gypsum is thoroughly mixed dry with 1 or 2 parts of sharp sand or a suitable grade of slag. The mixture is then sprinkled by means of a sprinkling can, and while being constantly mixed, as is practiced in the case of lime or cement concrete. The quantity of mixing water must necessarily be smaller, similarly to "poured" and "tamped" concrete.

The bottom surface is moistened. If it is particularly absorbent (dry cement concrete, Hourdis, etc.) the gypsum mortar should receive more water. The mortar is applied like cement or lime concrete, in depths of 3 to 4 cm. (1.2 to 1.6 in.), is tamped thoroughly until water appears at the surface.

To obtain an even surface, the gypsum concrete is sprinkled with some dry gypsum immediately upon tamping, after which it is rubbed or otherwise finished.

A floor laid in this way hardens and dries rapidly. It may be used two or three days later. However, it is advisable to protect it for another day or two with wood shavings to prevent it from too rapid evaporation.

The tamping method has the advantages of making use of less water, more rapid drying and no danger of cracks due to air currents.

It should be noted, that a gypsum floor, similar to other floors, requires at least four to eight weeks for complete drying, this period depending somewhat upon weather conditions. If this is not observed and the floor covered with linoleum too soon, bubbles may form under the latter and may lead to deterioration.

If a gypsum floor is to be used without linoleum, it should be first saturated with linseed oil and may later receive a coat of oil paint, as a wooden floor. It will be found that a floor of this kind may be in use for many years without showing any signs of wear. This assumes, however, that no admixtures are used.

A gypsum floor laid as specified above, will not become unsound, nor crack, but will remain hard, warm and durable.

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## The Part of Aggregates in Concrete Pavement Deterioration

A LONG and comprehensive report on "Causes of Concrete Pavement Deterioration" was made by J. S. Bixby, division engineer, division of highways, New York State Department of Public Works, to the February meeting of the Association of State Highway Officials of the North Atlantic States. The full report will be published by the New York State Department of Public Works. The following brief extract relating to aggregates is from an abstract of the report published in a recent issue of *Engineering News Record*:

"In this survey cross and diagonal cracking have been given considerable weight, but this measure of deterioration has not the same value for the old full-width pavements as for the modern panel type. In the former group this cracking is found to be irregular in character with wide openings not due entirely to age, while on the modern slab types diagonal cracks are greatly reduced and many of the cross cracks are fine, fairly straight, and approximately at right angles to the center line of road. Such cross cracks are simply contraction or bending joints installed by nature, and not a sign of weak or defective concrete.

"Much more important and significant on the modern panel road are the diagonal corner cracks or corner breaks which definitely split off a small section of pavement, leaving an unsupported section of concrete which is almost sure to settle and disintegrate under traffic and take adjacent areas of pavement with it.

"From the survey conclusions may be drawn that:

(1.) No preference can be shown for natural or washed sands under proper control, but from a study of curves supplemented by examination of the individual road reports, sand is the aggregate which is most variable, and when not under proper control is the greatset factor in scaling and other forms of deterioration.

(2) In all cases less scaling is found on gravel than on broken stone roads. It appears that this is due to the greater ease of manipulation with gravel, thereby avoiding the building up of a surface mortar coat.

(3) Good materials and good workmanship will avoid scaling with any combination of aggregates.

(4) Average gravel concrete does not give the record of strength and durability shown for average broken stone aggregate, especially after serious deterioration is started. Up to the point where age or traffic weight begins substantially to overcome pavement resistance, gravel pavements in many cases show as good or better results than those constructed with broken stone. Average gravel aggregates are cited as it appears clear from separate studies not shown here that there is substantial variation in the suitability of gravel aggregates derived from different deposits.

#### *Causes of Scaling*

(5) Scaling appears to consist of: (a) scaling due to concrete of poor quality, the sloughing away of the surface being merely the first step toward complete disintegration and failure of the pavement, or (b) what may be called true scale where an integral, thin mortar layer 1/32 to ¼-in. thick flakes off leaving a shallow depression. The first class of scaling does not deserve extensive consideration, as recent experience shows pavement failures are avoidable with ordinary up-to-date supervision and control.

"For true scale which appears on many apparently sound roads the following causes are submitted by the road reports: fine or dirty sand; coarse aggregates of large size; coarse aggregates ungraded; coated coarse aggregate; coarse aggregates with flinty surfaces; overmanipulation; late finishing; too much cement, and frosted surface.

"If one or two simple conditions causing scaling could be demonstrated, which if avoided would prevent scale, engineers would feel much relieved. But no information derived from this survey justifies any such conclusion. While overmanipulation may be cited by many engineers as the principal cause of scaling on otherwise satisfactory roads, there appears to be no warrant for discarding the other conditions cited as contributing to the same result. In the light of present information it is recommended to avoid scaling that every precaution may be taken to eliminate loam or similar material, to avoid materials and manipulation which will tend to produce a separate mortar coat above the main body of the slab, and to avoid finishing after the surface has taken an initial set.

*The Plaster City, Calif., gypsum mill of the Pacific Portland Cement Co. Consolidated, recently damaged by fire*

## Fire Damages Gypsum Plant Near El Centro, Calif.

FIRE of unknown origin damaged one of the largest gypsum mills on the Pacific coast on August 11, when the mill of the Pacific Portland Cement Co. Consolidated, at Plaster City, Calif., was burned. All the buildings except the machine shop and roundhouse were destroyed, according to local papers.

Plaster City is near El Centro, Calif., in the Imperial Valley, and the plant was built there because of its nearness to one of the most remarkable gypsum deposits in the world, a great hill of almost pure gypsum. This was quarried by well-drill hole and steam shovel methods, loaded into 30-ton cars and brought over 27 miles of narrow-gage railroad to the mill. A description of the operation was published in ROCK PRODUCTS, May 16, 1925.

Water is very scarce in the part of California where the plant was situated and its location was partly determined by this consideration. A long pipe line brought in water for plant use from the Colorado river.

It is now reported that the plant is to be rebuilt at once.

## San Diego Silica Sand Deposit Under Development

A NEW company, the Crystal Silica Sand Co. of Los Angeles, Calif., is reported to have started the development of an 80-acre deposit of silica sand near Oceanside, Calif. The property is said to contain a large quantity of high-grade silica suitable, after preparation, for use in making glass.

The Santa Fe railroad has started the construction of a spur track from the Escondido branch into the pits and plans have been made to build a line of the San Diego Consolidated Gas & Electric Co. into the property to furnish power.

Present plans of the company call for the installation of a dragscraper, conveyors, rotary screens, dewaterers and classifiers. The initial production will be about 100 tons of washed material per eight hour day, which later will be increased to about 350 tons.

Other officers of the company besides J. A. Benell, who is president, are: O. A. Topham, vice-president and an executive of the Pacific Door and Sash Co.; T. B. Hatten, treasurer, and president of the T. B. Hatten Co., Inc.; and Dr. C. A. Porter, treasurer.—*San Diego* (Calif.) *Union.*

## Gravel Corporation Wins Fight to Enter Harbor

THE Seaboard Sand and Gravel Corp. of Port Jefferson, Long Island, N. Y., has won a four months' fight to enter Mount Sinai harbor, Long Island, with its dredging operations. According to Long Island local papers, permission has been granted the company by the U. S. War Department, over the protest of an association of objecting residents known as the Mount Sinai Taxpayers Association.

This contest is one of a number that have come from the opposition of residents of Long Island to sand and gravel production on the ground that the operations were unsightly and, in some cases, they discolored the water near the shore. The opposition has come in spite of the fact that the sand and gravel industry has supported many families in the villages from which it came and actually increased the value of business property in them.

The Seaboard Sand and Gravel Corp. is one of the largest of the Long Island producers. It operates a 20-in. pump dredge and has an output of nearly 10,000 tons per day.

## Mohawk Company Entertains

THE Mohawk Limestone Products Corp., Jordanville, N. Y., through its marketing organization, the Oneonta Feed and Grain Exchange, entertained limestone dealers at the Otsego Hills Country and Golf Club at a dinner recently. About 50 dealers of central New York were guests and heard two addresses by officials of the Mohawk company on the operation of quarries and the marketing business for limestone. Following the addresses the dealers inspected the Jordanville quarries of the company.—*Herkimer* (N. Y.) *Telegram.*

## Portland Cement Company Buys Railroad

THE controlling interest in the Graysonia, Nashville and Ashdown railroad, has been sold by Charles M. Conway of Texarkana to the Arkansas Portland Cement Co.

Mr. Conway, who retains a part of the stock, was named president and general manager of the reorganized road. The cement company is constructing a plant at White Cliffs, north of Texarkana on the Little river and Red river. Approximately $200,000 will be spent by the cement company in rebuilding and repairing the road.—*Kansas City* (Mo.) *Times.*

## Samuel L. May

SAMUEL L. MAY, of Evansville, Ind., long connected with the sand and gravel industry and the building of river improvements on the lower Ohio, died August 23 from injuries received in an automobile accident. He was 52 years old.

Mr. May was one of the wealthiest men in Evansville, and he had raised himself to that position solely by his own efforts. He began in the contracting business with Capt. Hollerbach, whose daughter he later married, and built many locks and dams along the Ohio, the company being known as the National Contract Co. He was also connected with the Union Sand and Gravel Co. and the Union Concrete Pipe Co., and he was president of the Citizens National Bank of Evansville.

Mr. May found many other interests in life than those connected with his businesses. His charities were many, and one by which he will long be remembered was his support of the Evansville Blind Association, of which he was president for many years. He left a very large estate and his will disposed of a considerable portion of it to charities. He was recognized as one of the leading citizens of his town, as he served two terms as president of the chamber of commerce and he was active in fraternal and social organizations.

The funeral was held in Evansville, August 26.

# Use of Fluorspar in Cement Manufacture*

By Dr. Hans Becker
Research Engineer, Berlin, Germany

THE last two years have seen a successful effort on the part of Germany to catch up with Switzerland and German Austria in the matter of manufacture of high strength special cements. This progress is due to the spreading of knowledge of the physical chemical principles involved in the structure of clinker and of the setting processes, as well as to innovations and perfections of cement machinery.

The progress achieved in the technique of pulverizing and calcining has somewhat obscured the value of certain admixtures, which facilitate these processes.

At the beginning of 1924, *Zement* published reports of outstanding scientists on tests, which promised great advantages to be gained through admixtures of fluorspar in the raw mix. However, these researches did not find an adequate echo in practice, although the use of fluorspar in the cement industry has since then increased considerably and now presents a range of figures entirely out of comparison with those of 1923. The mysterious veil, which has for years covered the use of fluorspar, has not yet been lifted.

As the author was first among his contemporaries to take up the question of fluorspar, he deems it adequate to summarize below the results of all investigations of this subject known to him with a request for supplementary information from professional colleagues.

### *Fluorspar Facilitates Sintering*

Fluorspar increases to a high degree the viscosity of silicate melts, when added in correct proportions. This increase of viscosity is much more apparent in all technical processes than the lowering of the point of fusion, which is produced everywhere where the quantity of admixture is selected in a manner not exceeding a new eutectic. It can, therefore, be considered an established fact, that admixtures of fluorspar "facilitate sintering."

The question arises whether this aiding of the sintering process is entirely advantageous and simultaneously results in a beneficial effect on cement quality, whether the fluorspar itself reduces the quality of clinker or causes any subsequent changes in the cement. For some time it has been argued whether a system ($CaO$, $SiO_2$, $Al_2O_3$, $Fe_2O_3$) approaching the equilibrium as nearly as possible truly represents the optimum of desirable properties in clinker.

This equilibrium problem should be approached from various standpoints.

1. Were the components in a state of equilibrium at sintering temperature?
   Did the sintering temperature remain high long enough to bring these components into a state of equilibrium?
2. Upon cooling were the clinker minerals in a state of equilibrium corresponding to room temperature?
   Was cooling gradual enough so that conditions produced by sintering temperature could change in accordance with the temperature drop (absence of $H_2O$ and $CO_2$ assumed)?

Which one of the various forms corresponds to an optimum of properties in clinker or is it possible that several maxima may be reached by several methods?

Answering these questions means to take the entire science of hydraulic cements by the roots and deciphering it. Only an outline will be attempted here. The first limitation consists in dealing with portland cement clinker only.

Portland cement hardening in contact with water is based on the fact, that clinker minerals, if sufficiently finely subdivided, are unstable in the presence of water, and undergo a change which results in a relatively dense and hard new mineral formed in a certain period of time. Emphasis should here be placed on "certain period of time," for we know of many other mixing proportions ($CaO{\cdot}SiO_2{\cdot}Al_2O_3{\cdot}Fe_2O_3$) of the same components in a similar condition of equilibrium, which are too slow or too rapid-hardening or react with water without any consequent hardening. It has been found that good hardening depends particularly on the alkalinity of the solution formed by the clinker. The Ca- and OH-ion concentration must bear a correct ratio to the silica, aluminum and iron hydroxides capable of reacting and actually undergoing a reaction.

Attention should be paid to the degree in which these compounds are capable of reacting. The Ca may be present as hydrated or burned lime. Burned lime may react more or less readily depending upon its temperature of calcination.

Similarly we may encounter silicic acid, slightly heated $SiO_2$ and all the intermediate stages up to fused $SiO_2$ or we may deal with its natural modifications. The same conditions pertain to aluminum and iron oxide. We may also consider the decomposition of the clay substance, which decomposes to form $Al_2O_3$ and $SiO_2$ when heated to around 700 deg. C.

As it is quite certain that the hardening process results in a permanent displacement of the equilibrium, the rate of solution of the different components, which depends on the modifications in which they are present as well as on the fineness, must be of the same influence as their absolute quantities. Such methods are used in technique with a relative success in the manufacture of cements from lime and trass or silica.

Another possibility consists in producing mixtures and compounds, whose decomposition in contact with water results in the components $Ca(OH)_2{\cdot}Si(OH)_n$, $Al(OH)_3$, $Fe(OH)_3$. Here also the most important condition is that these compounds are decomposed by water at a rate, which is most favorable for the hardening of the products of hydration or which results in further solution of the clinker substance.

That this process, ordinarily summed up by "setting," is supplemented by another one, the hardening, may be mentioned here in passing. Hardening includes similar decomposition of the products as setting.

Practice and technical experience show us, that the manufacture of artificial minerals is more easily accomplished when their composition and shape of particles is selected with a view to a most favorable reaction with $H_2O$. The manufacture of portland cement was thus arrived at.

### *High Lime Content in Cement Not Ideal for Mortar Making*

In the meantime we should not be satisfied with the seemingly perfect results and should keep in mind such deficiencies of portland cement, as are almost inevitable in present-day manufacture. The author wishes to emphasize especially that a high lime content of portland cement is not an ideal condition for its mortar-making properties. Of course, we need the high CaO content to produce a rapid decomposition of strongly burned clinker by water.

The long way by which present-day portland cement was reached allowed many an observation to be made, which has since been forgotten, but which contains a valuable lesson. I have shown in the above that only a correct ratio of $Ca(OH)_2$ on one hand and acids on the other results in hardening of the *solution*. The conditions existing in the clinker are only of secondary importance, being of moment only to the extent to which they determine the solution.

### *Clinker Really a Mixture of Minerals*

Clinker is a mixture of different minerals, consisting mainly of the compounds $CaO{\cdot}SiO_2{\cdot}Al_2O_3{\cdot}Fe_2O_3$. We can imagine,

*Zement (1927), 16, 305-8.

that a different mixture of minerals consisting of the same components, present in a different state, also capable of producing lime, silica, etc., hardens in a similar manner without remaining free lime. This is true, for example, of a mixture of clay and lime, containing considerably less lime, but burned to a considerably lesser degree. We should remember that natural limestones of different $CaCO_3$ content yield very good cements when burned at suitable temperatures. An extreme case of this was reported by Grimm at the 1924 convention of the German Portland Cement Manufacturers Association. On account of the very low lime content of less than 20%, the temperature must also be kept low, I believe around 800 deg. C. An hydraulic cement results characterized by exceptionally high initial strength. A similar report was made by Dr. Hans Kühl on fineness and sintering.*

It is made clear in this report that not only each raw mix of certain materials, but also each fineness of individual mixes corresponds to a definite optimum temperature producing highest strength properties.

As we are certain of that, the calcination temperature and duration remaining the same, clinkers resulting from coarsely ground mixes are farther from a state of equilibrium. A critical analysis of these reports shows that it is not always the most closely approximated equilibrium at sintering temperature which results in the best cement.

### *Composition Analysis of Clinker No Clue to Properties*

Summarizing the above, I wish to state: The gross analysis of the clinker composition does not give a clue to the properties of cement. The composition of the water solution is of greater importance. The cement should go into solution in such a way that lime, silica and alumina are replaced in this solution as rapidly as they are removed through hydration.

This depends on the reaction of clinker components which may be aided by greater fineness of the raw mix, and varies with sintering temperature and duration. Thus a complete equilibrium of components at sintering temperature is not a criterion of cement properties.

Therefore, fluorspar, which undoubtedly is beneficial to this equilibrium, does not always improve the quality of cement regardless of properties of raw materials, given lime content, fineness and sintering temperature.

And just as increased fineness, sintering temperature and lime content (the latter within certain limits)—all of which processes have in recent years contributed greatly to the quality of cement—cannot be disregarded nor are disregarded, as experience shows that under certain conditions they may lead to a decrease of quality, the effect of fluorspar cannot be discarded just because it frequently fails to produce palpable advantages due to low sintering.

It is safe to assume that the condition of instability corresponding to the given composition and lime content, which produces optimum strength properties has been passed. It was also stated above, that the state produced by cooling had a considerable effect on cement quality.

We can speak with more assurance in this connection, judging from the properties of blast furnace slag, that the retention of a most unstable, glassy condition is beneficial for the activity. I believe, that it is sufficient to point to my previous elaborations on required compositon of the resulting solution and rate of decomposition of individual clinker minerals, to prove that this view does not necessarily apply to all portland cement clinkers. On the other hand, we all know that a certain acceleration of cooling has good results with respect to cement quality. Here also certain conditions may result in failure of fluorspar.

The presence of fluorspar increases the liquid phase. It also remains liquid for a longer time during cooling, thus, benefiting chemical activity. (I have shown before experimentally, that up to 900 deg. C. a considerable quantity retains its liquid phase.)

Clinker containing no $CaF_2$ loses all of its liquid phase already at 1270-1300 deg. C., the minerals being able to assume the equilibrium corresponding to temperature only very gradually. On the contrary, fluorspar clinker follows the change of equilibrium with relative readiness up to these low temperatures. This results in the phenomenon of strong deterioration observed on fluorspar cement clinkers.

### *Fluorspar Clinker Must Be Cooled Rapidly*

Fluorspar clinker must, therefore, be cooled more rapidly than standard portland cement clinker, even when all conditions of manufacture are selected to produce through calcination a product identical with normal portland cement clinker.

Having shown in the foregoing how different may be the conditions of aiding the sintering process, we will now approach the second fundamental problem:

Does the presence of $CaF_2$ at temperatures in question (900-1400 deg. C.) and added in quantities of 0-5%, result in a detrimental effect?

I will not discuss here the small quantities of fluorine contained in the exhaust gases, whose detrimental influence has never yet caused practical complications. Only the fluorine contained in the cement will be treated here. It may be stated from the start that no such action has been observed.

The proof, which I will furnish, is an indirect one and has its weak points. I can only state, that I have never observed such action through years of observation of cement test specimens, cured in air and in water.

Compounds, which may form in portland cement clinkers when $CaF_2$ is present, are not known. As several double compounds of calcium fluoride with calcium silicate and carbonate occur in nature, we may assume that analogous compounds can form in the clinker. These are easily decomposed in water and thus made harmless, or, similar to magnesia compounds, they decompose subsequently with resulting deterioration of the concrete. Another possibility is that we deal here with compounds with low transition point and very slow rate of change, so that a later modification involving volume changes results in a destructive action.

These deductions are based on a statement of Michaelis in 1875, that cements, containing admixtures of fluorspar, frequently show good initial hardening, but suffer a distinct relapse at 3-4 months and deteriorate. Aside from this, I have heard oral statements to that effect from third parties on similar observations made at the beginning of this century.

As early as 1882 this phenomenon was ascribed by Erdmenger to insufficient fineness of fluorspar. No such observations were made in recent years to my knowledge. I would be greatly indebted for reports of observations on subsequent deterioration of fluorspar cement.

I will summarize my statements as follows:

### *Conclusions*

An admixture of fluorspar cannot be expected to produce successful results in every mix, of which fineness, temperature of sintering and duration of the sintering remain

The fineness of the raw mix and, particularly, the conditions of sintering should be selected with special consideration of a new mix. In a given case one may also vary the components of the raw mix accordingly, the variation being most easily produced by a change of the lime content.

Only in relatively rare cases does a plant require but one change—the aiding of the sintering process—and accomplishes it by the selection of a proper quantity of admixture. In most cases, some of the other plant processes must be altered to suit the lower sintering temperatures or lighter sintering.

It remains an established fact, however, that fluorspar greatly benefits the sintering process. Proofs of any detrimental effect on cement properties produced by $CaF_2$ have not been furnished.

All of my personal experience and all test results reported by others bring one conclusion: sintering is aided and the sintering temperature is lowered.

The phenomena of quick- or slow-setting properties, of good or poor hardening, observations of soundness, ease of grinding, etc., are the results of low sintering in its effect on the raw mixes used and the handling during sintering.

*Zement (1921), 18.

# West Jersey Sand and Supply Corp. Merged Into Charles Warner Co.

THE merger of the West Jersey Sand and Supply Corp., of Philadelphia, with the Charles Warner Co. has been completed insofar as actual acquisition of the West Jersey company's stock is concerned. Handling of the acquired company's business in the name of the Charles Warner Co. will probably be put into effect about January, 1928, according to the *Warner American News* and local papers.

The various plants of the West Jersey company have for several years been receiving sand and gravel from the Manor plant of the Warner company. The Warner company owned a small amount of stock in the West Jersey company and was represented on its board of directors and the West Jersey company owned a small amount of stock in the Warner company and was also represented in the Warner board of directors. Under the new arrangements the Warner company has bought the West Jersey company completely.

The West Jersey company has an annual capacity of more than 1,000,000 tons of sand and gravel a year. It operates a plant at Tacony, Del., on the Delaware river, and owns two piers, both in Wilmington and on the Delaware river, and two yards on the Schuylkill river.

A new organization to be formed within the next few months provides for Mr. Foster, president of the West Jersey company, to assume the position of vice-president and division manager of the Charles Warner Co. in charge of sand and gravel production, river transportation and the Philadelphia and Wilmington retail operations of the company. Mr. Shoemaker, vice-president of the West Jersey company, becomes a vice-president of the Warner company and Philadelphia retail manager. Philadelphia retail sales will be under the direction of J. F. Zugehoer as Philadelphia retail sales manager. Reed C. Bye, general manager of the Warner company in the old company, becomes vice-president and division manager of the company's lime and stone plants and all its wholesale organizations throughout the eastern United States.

## Group Insurance for Knoxville Marble Quarry Employes

A GROUP insurance program, establishing more than $175,000 of life insurance, and liberal sick and accident benefits has been adopted by the Knoxville Marble Co., of Knoxville, Tenn., for the benefit of its employes.

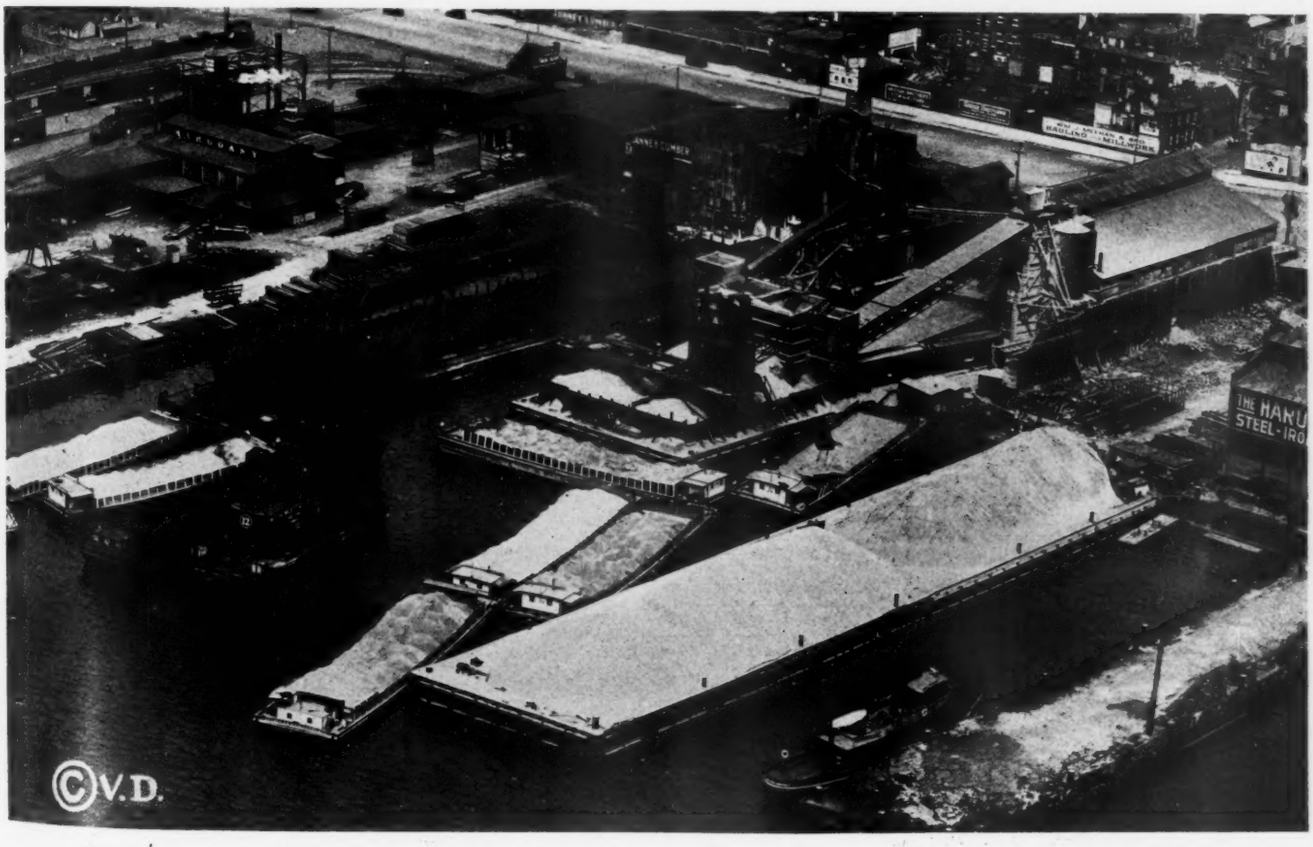
The plan was made effective on a co-operative basis through contract with the Metropolitan Life Insurance Co. By the co-operative arrangement, the employer and employes will jointly pay the premiums.

Based on position occupied, the schedule of insurance provides each contributing employe with life insurance ranging from $500 to $3000, while under the terms of the health and non-occupational accident policy, weekly benefits of $10 to $30 will be paid for each case of disability covered. Payments will continue for a maximum of 26 consecutive weeks.

Besides the double protection provided by the life and health and accident insurance, an employe becoming totally and permanently disabled before the age of 60, will receive the full amount of his life insurance in monthly installments.

Five hundred employes of the Grey Knox Marble Co., of Knoxville, Tenn., have also accepted their employer's offer of group insurance providing more than $75,000 of life insurance protection. The amount of life insurance each employe receives is determined by his position and ranges from $1000 to $5000. The contract includes a clause, under which any insured employe becoming totally and permanently disabled before he is 60, will receive the full amount of his life insurance in monthly installments.

As a part of the general group plan in each case, sick or injured employes covered by the insurance are entitled to the services of a visiting nurse, placed at their disposal by the insurance company. In addition to this, a health advisory bureau regularly distributes authoritative pamphlets on disease prevention and health conservation.




*One of the docks of the West Jersey Sand and Supply Corp., recently acquired by the Charles Warner Co.*

# Financial News and Comment

## RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

**(These are the most recent quotations available at this printing. Revisions, corrections and supplemental information will be welcomed by the editor.)**

| Stock | Date | Par | Price bid | Price asked | Dividend rate |
|---|---|---|---|---|---|
| Allentown Portland Cement Co. (common)[22] | May 24 | ..... | 1½ | 3 | |
| Allentown Portland Cement Co. (6% bonds, 1932)[22] | May 24 | ..... | 87 | 92 | |
| Alpha Portland Cement Co. (common)[2] new stock | Aug. 29 | No par | 38 | 41 | 75c quar. July 15 |
| Alpha Portland Cement Co. (preferred)[2] | Aug. 29 | 100 | 115 | ..... | 1¾% quar. June 15 |
| American Lime and Stone Co. (7% bonds, 1942)[22] | May 24 | ..... | 39 | 39½ | |
| Arundel Corporation (sand and gravel—new stock) | Aug. 30 | No par | 41¾ | 42 | 50c July 1 |
| Atlantic Gypsum Products Corp. (1st 6's carrying 10 sh. com.)[10] | Aug. 31 | ..... | 119 | 121 | |
| Atlas Portland Cement Co. (common)[2] | Aug. 29 | No par | 42 | 44 | 50c qu. June 1 |
| Atlas Portland Cement Co. (preferred) | ..... | 100 | ..... | ..... | 2% quar. Oct. 1 |
| Atlas Portland Cement Co. (preferred)[2] | Aug. 29 | 33⅓ | 43 | ..... | 2% quar. July 1 |
| Beaver Portland Cement Co. (1st Mort. 7's)[8] | July 29 | 100 | 100 | 100 | |
| Bessemer Limestone and Cement Co. (Class A)[4] | Aug. 16 | ..... | 31⅛ | 31¾ | 75c quar. Aug. 1 |
| Bessemer Limestone and Cement Co. (6½% bonds)[4] | Apr. 8 | ..... | 99 | 100 | |
| Boston Sand and Gravel Co. (common) | Aug. 29 | 100 | ..... | 75 | 1% qu., 2% ex. Jan. 1 |
| Boston Sand and Gravel Co. (preferred) | Aug. 29 | ..... | ..... | 85 | 1¾% quar. Jan. 1 |
| Boston Sand and Gravel Co. (1st preferred) | Aug. 29 | ..... | ..... | 90 | 2% quar. Jan. 1 |
| Canada Cement Co., Ltd. (common) | Aug. 30 | 100 | 185 | 185½ | 1½% qu. July 16 |
| Canada Cement Co., Ltd. (preferred)[11] | Aug. 26 | 100 | 123 | ..... | 1¾% quar. Aug. 16 |
| Canada Cement Co., Ltd. (1st 6's, 1929)[11] | Aug. 29 | ..... | 100½ | 101 | 3% semi-annual A&O |
| Canada Crushed Stone Corp., Ltd. (6½s, 1944)[11] | Aug. 29 | 100 | 95 | 99 | |
| Charles Warner Co. (lime, crushed stone, sand and gravel) | Aug. 27 | No par | 29½ | ..... | 50c July 11 |
| Charles Warner Co. (preferred) | Aug. 27 | 100 | 105½ | ..... | 1¾% quar. July 28 |
| Cleveland Stone Co. (new stock) | Aug. 29 | ..... | 58 | 60 | |
| Connecticut Quarries Co. (1st Mortgage 7% bonds)[17] | Aug. 26 | 100 | 105 | ..... | 50c qu. June 15 |
| Consolidated Cement Corp. (1st Mort., 6½s, series A)[24] | Aug. 31 | 100 | 97 | 99 | |
| Consolidated Cement Corp. (5 yr. 6½% gold notes)[24] | Aug. 31 | 100 | 94 | 98 | |
| Consumers Rock and Gravel Co. (1st Mort. 7s)[18] | Aug. 11 | 100 | 100 | 101½ | |
| Coosa Portland Cement Co. (6% bonds, 1944)[22] | May 24 | ..... | 70 | ..... | |
| Coplay Portland Cement Co. (6% bonds, 1941)[22] | May 24 | ..... | 88 | ..... | |
| Dewey Portland Cement Co. (1st mort. 6's 1942)[30] | Aug. 31 | 100 | 98½ | ..... | |
| Dolese and Shepard Co. (crushed stone)[7] | Aug. 31 | 50 | 103 | 106 | $1.50 July 1, $1 ex. July 1 |
| Egyptian Portland Cement Co. 7% pfd.[21] | Aug. 26 | ..... | 85 | 90 | 1¾% quar. July 1 |
| Egyptian Portland Cement Co. (common)[21] | Aug. 26 | ..... | 5 | 7 | 40c quar. Oct. 1 |
| Fredonia Portland Cement Co. (6½% bonds, 1940)[22] | May 24 | ..... | 97 | 101 | |
| Giant Portland Cement Co. (common)[2] | Aug. 29 | 50 | 45 | 55 | |
| Giant Portland Cement Co. (preferred)[28] | Aug. 29 | 50 | 40 | 45 | 3½% June 15 |
| Ideal Cement Co. (common) | Aug. 30 | No par | 83 | 84 | $1 quar., July 1 |
| Ideal Cement Co. (preferred)[33] | Aug. 27 | 100 | 111½ | 112½ | 1¾% quar. July 1 |
| International Cement Corporation (common) | Aug. 30 | No par | 55⅜ | 55¾ | $1 quar. Sept. 30 |
| International Cement Corporation (preferred)[2] | Aug. 30 | 100 | 107½ | 108½ | 1¾% quar. Sept. 30 |
| Kelley Island Lime and Transport Co. | Aug. 29 | 100 | 160½ | 165 | $2 quar. July 1 |
| Lawrence Portland Cement Co.[2] | Aug. 29 | 100 | 99 | 103 | 2% quar. |
| Lehigh Portland Cement Co.[6] | Aug. 29 | 50 | 112 | 117 | 1½% quar. |
| Lyman Richey Sand and Gravel Co. (1st Mort. 6s, 1928 to 1931)[13] | Aug. 12 | 100 | 99½ | 100 | |
| Lyman Richey Sand and Gravel Co. (1st Mort. 6s, 1932 to 1935)[13] | Aug. 12 | 100 | 97½ | 99 | |
| Marblehead Lime Co. (1st Mort. 7's)[14] | Aug. 26 | 100 | 100 | ..... | |
| Marblehead Lime Co. (5½% notes)[14] | Aug. 26 | 100 | 98 | ..... | |
| Michigan Limestone and Chemical Co. (common)[6] | Aug. 29 | ..... | 26 | 28 | |
| Michigan Limestone and Chemical Co. (preferred)[6] | Aug. 29 | ..... | 24 | 26 | 1¾% quar. July 15 |
| Missouri Portland Cement Co. | Aug. 30 | 25 | 40½ | 41 | 50c Aug. 1 |
| Monolith Portland Cement Co. (common)[9] | Aug. 26 | ..... | 12¼ | 12⅝ | 8% ann. Jan. 2 |
| Monolith Portland Cement Co. (units)[9] | Aug. 26 | ..... | 30¾ | 31⅞ | |
| Monolith Portland Cement Co. (preferred)[9] | Aug. 26 | ..... | 9¼ | 9⅝ | |
| National Gypsum Co. (common)[25] | Aug. 30 | ..... | 56 | 59 | |
| National Gypsum Co. (preferred)[25] | Aug. 31 | ..... | 83 | 86 | |
| National Gypsum Co. (pref. carrying acc. div.)[25] | Aug. 18 | ..... | 81 | 84 | |
| Nazareth Cement Co.[20] | Aug. 26 | No par | 32 | 34 | 75c quar. Apr. 1 |
| Newaygo Portland Cement Co.[1] | Aug. 26 | ..... | 110 | 115 | |
| Newaygo Portland Cement Co. (6½% bonds, 1938)[22] | May 24 | ..... | 100 | 102 | |
| New England Lime Co. (Series A, preferred)[14] | Aug. 26 | 100 | ..... | 95 | |
| New England Lime Co. (Series B, preferred)[22] | Aug. 29 | 100 | 97 | 99 | |
| New England Lime Co. (V.T.C.)[22] | Aug. 29 | ..... | 33 | 35 | |
| New England Lime Co. (6s, 1935)[14] | Aug. 26 | 100 | 98 | 100 | |
| New York Trap Rock Corp. (6% bonds, 1946)[32] | Aug. 30 | ..... | 101 | 101¼ | |
| North American Cement Corp. 6½s 1940 (with warrants) | Aug. 29 | 100 | 86 | 86 | |
| North American Cement Corp. (units of 1 sh. pfd. plus ½ sh. common)[32] | July 14 | ..... | 60 | 65 | 2 mo. period at rate of 7% |
| North American Cement Corp. (common)[19] | Apr. 9 | ..... | 8⅛ | 9 | |
| North American Cement Corp. (preferred) | Apr. 25 | ..... | ..... | ..... | 1.75 quar. Aug. 1 |
| North Shore Material Co. (1st Mort. 6's)[15] | Aug. 31 | 100 | 98½ | ..... | |
| Pacific Portland Cement Co. (common, new stock) | Aug. 27 | ..... | 26 | ..... | |
| Pacific Portland Cement Co., Consolidated[5] | Aug. 27 | 100 | 61¾ | ..... | 25c mo. |
| Pacific Portland Cement Co., Consolidated (secured serial gold notes)[5] | Aug. 27 | 100 | 98 | ..... | 3% semi-annual Oct. 15 |
| Peerless Portland Cement Co.[1] | Aug. 26 | 10 | 4¼ | 4¾ | |
| Pennsylvania-Dixie Cement Corp. (1st Mort. 6's)[29] | Aug. 30 | 100 | 98½ | 98½ | |
| Pennsylvania-Dixie Cement Corp. (preferred)[28] | Aug. 31 | 100 | 91 | 93½ | 1¾% Sept. 15 |
| Pennsylvania-Dixie Cement Corp. (common)[28] | Aug. 30 | ..... | 23¾ | 24 | 80c July 1 |
| Petoskey Portland Cement Co.[1] | Aug. 17 | 10 | 11 | 11½ | 1½% quar. |
| Pittsfield Lime and Stone Co.[31] | Apr. 26 | ..... | ..... | 100 | |
| Pittsfield Lime and Stone Co.[31] (common) | Feb. 25 | ..... | ..... | 25 | |

**(CONTINUED ON PAGE 88)**

[1]Quotations by Watling, Lerchen & Hayes Co., Detroit, Mich. [2]Quotations by Bristol & Willett, New York. [3]Quotations by True, Webber & Co., Chicago. [4]Quotations by Butler, Beading & Co., Youngstown, Ohio. [5]Quotations by Freeman, Smith & Camp Co., San Francisco, Calif. [6]Quotations by Frederic H. Hatch & Co., New York. [7]Quotations by F. M. Zeiler & Co., Chicago, Ill. [8]Quotations by Ralph Schneeloch Co., Portland, Ore. [9]Quotations by A. E. White Co., San Francisco, Calif. [10]Quotations by Lee Higginson & Co., Boston and Chicago. [11]Nesbitt, Thomson & Co., Montreal, Canada. [12]E. B. Merritt & Co., Inc., Bridgeport, Conn. [13]Peters Trust Co., Omaha, Neb. [14]Second Ward Securities Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois, Chicago. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Chas. W. Scranton & Co., New Haven, Conn. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hemphill, Noyes & Co., New York. [20]Quotations by Bond & Goodwin & Tucker, Inc., San Francisco. [21]Baker, Simonds & Co., Inc., New York. [22]William C. Simons, Inc., Springfield, Mass. [23]Blair & Co., New York and Chicago. [24]A. B. Leach and Co., Inc., Chicago. [25]A. C. Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [27]J. G. White and Co., New York. [28]Mitchell-Hutchins Co., Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago. [31]McIntyre & Co., New York, N. Y. [32]Hepburn & Co., New York. [33]Boettcher & Co., Denver, Colo. [34]Kidder, Peabody & Co., Boston, Mass. [35]Farnum, Winter and Co., Chicago. [36]Hanson and Hanson, New York.

# Editorial Comment

**Rock Products for Permanency**

ROCK PRODUCTS has been criticized for representing only the established industry, and for discouraging rather than welcoming the man with small capital, and little or no experience, who is trying to establish himself in some branch of the industry. The truth of the criticism is admitted. Editorially and in private correspondence this paper has always discouraged the entrance of newcomers into a field where the established industry was fully able to take care of the market's demands. This for two reasons, the first and perhaps the most important being that a plant built with insufficient capital and operated by inexperienced men usually produces a product of such poor quality as to hurt the reputation of all the material produced in that locality, and second, because inexperienced men do not usually know how to determine real costs, and so sell the product not only below the prevailing market price but below the cost of production. This disorganizes the business for a long time, even after they have driven themselves out of it.

There is a third reason, almost as important, which is that such operations usually end in failure, and when they fail they carry down some good people with them. A fair illustration of the end of such enterprises is given in the following, clipped from a recent New Jersey local paper:

Vice Chancellor Maja Leon Berry has appointed W. Ryal Burtes, of Freehold, as receiver for the Monmouth Washed Sand and Gravel Co., Inc., of Jerseyville, on application of Frank Federici.

Lawyer Finegold appeared before Vice Chancellor Buchanan and obtained an order to show cause why the company should not be declared insolvent. The officers of the corporation admitted the charge and Vice Chancellor Berry's action followed.

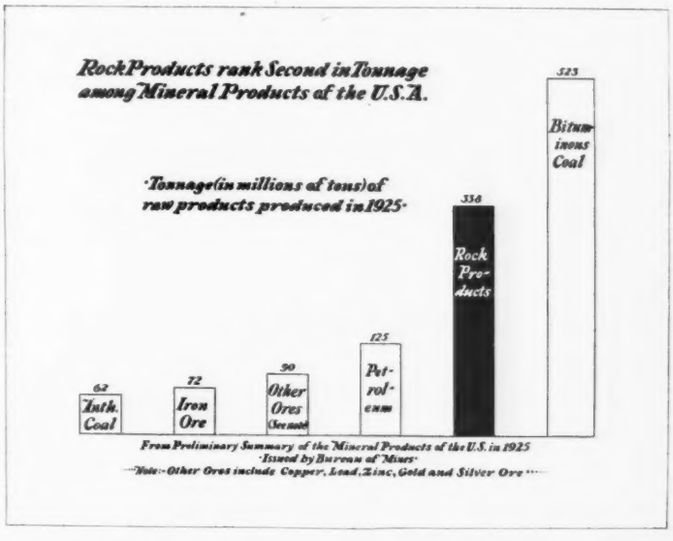
The company was incorporated last February by George B. Fournier, Anna M. Fournier and Armand J. Fournier, all of Middletown; Louise Van Auken, of Freehold, and Patsy Sarabuchello, of Matawan. It is stated that the liabilities of the firm amount to $55,437.11, with mortgage totaling $17,400. Eight thousand dollars has been paid on the bill of $23,629 for machinery which was bought on a contingent basis. Federici, who brought the charges of bankruptcy, is said to hold an $8,000 mortgage and the corporation's note for $500.

The most cursory reading of any issue of ROCK PRODUCTS will convince anyone that the real money that goes into new construction in the rock products industry is spent by established producers. They build new plants because the business grows, because old plants wear out and because more exacting specifications demand a better product. They do not buy machinery on a "contingent basis," and they pay for what they buy. It is because of this that ROCK PRODUCTS is standing for the *established* industry.

**Rock Products Second in Tonnage**

A recent compilation made by our own research department is so interesting to us that we feel sure it will be equally so to most of our readers. Many similar compilations have been published from time to time of the relative *values* of various mineral products, but this is the first we know of showing relative *tonnages*. To manufacturers of equipment and machinery, tonnages produced and handled in various industries are significant in determining the importance of those industries to them.

It is startling therefore to see that the rock products industries are second only to bituminous coal, by a great margin, in tonnages produced. Actually the rock products industries represent greater consuming markets for machinery and equipment than the bituminous coal industry, because in nearly all the rock products industries processing is carried much further than in the preparation of bituminous coal for the market.




The compilation is valuable to producers themselves in giving them a new sense of their economic importance. Thousands of men are employed and millions of dollars in capital are invested in manufacturing enterprises whose markets are now represented entirely or in large part by the rock products industries.

The compilation should be equally valuable to producers in understanding their economic importance to the railways. Roughly, the rock products industries furnish the railways with revenue tonnage equal to or greater than the bituminous coal industry, because the difference in tonnage represented on the graph in the heights of the two columns, is about the tonnage of coal consumed by the railways themselves, most of which is not revenue producing.

## RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS (Continued)

| Stock | Date | Par | Price bid | Price asked | Dividend Rate |
|---|---|---|---|---|---|
| Riverside Portland Cement Co. | May 9 | ..... | 165 | ..... | 50c monthly, $1.50 ex Aug. 1 |
| Rockland and Rockport Lime Corp. (1st preferred)[34] | Aug. 27 | 100 | 101 | ..... | 3½% semi-annual Aug. 1 |
| Rockland and Rockport Lime Corp. (2nd preferred)[34] | Aug. 27 | 100 | 57 | 65 | 3% semi-annual Aug. 1 |
| Rockland and Rockport Lime Corp. (common)[34] | Aug. 27 | No par | ..... | 50 | 1½% quar. Nov. 2 |
| Sandusky Cement Co. (common)[1] | Aug. 2 | 100 | 125 | 135 | $2 qu. July 1 |
| Santa Cruz Portland Cement Co. (bonds)[8] | Aug. 11 | ..... | 105½ | ..... | 6% annual |
| Santa Cruz Portland Cement Co. (common)[8] | Aug. 27 | ..... | 85⅛ | ..... | $1 quar., $1 ex. Jan. 1 |
| Schumacher Wallboard Corp. (common) | Aug. 27 | ..... | 25½ | 25⅜ | |
| Schumacher Wallboard Corp. (preferred) | Aug. 13 | ..... | 26½ | 26¾ | |
| Southwestern Portland Cement Co. (units) | May 11 | ..... | 205 | ..... | |
| Superior Portland Cement, Inc. (Class A)[30] | Aug. 27 | ..... | 46½ | 47½ | |
| Superior Portland Cement, Inc. (Class B)[30] | Aug. 23 | ..... | 23½ | 24½ | |
| United Fuel and Supply Co. (sand and gravel) 1st Mort. 6s[27] | July 14 | 100 | 98 | 100 | |
| United Fuel and Supply Co. (sand and gravel) 6% gold notes[27] | July 14 | 100 | 98 | 100 | |
| United States Gypsum Co. (common) | Aug. 31 | 20 | 99¼ | 99¼ | 40c quar. Sept. 30 |
| United States Gypsum Co. (preferred) | Aug. 30 | 100 | 123 | ..... | 1¾% quar. Sept. 30 |
| Universal Gypsum Co. (common)[3] | Aug. 31 | No par | 4¾ | 5¼ | |
| Universal Gypsum V.T.C.[3] | Aug. 31 | No par | 4¼ | 5 | |
| Universal Gypsum Co. (preferred)[3] | Aug. 31 | ..... | 40 | ..... | 1½% Feb. 15 |
| Universal Gypsum and Lime Co. (1st 6's, 1946)[5] | Aug. 31 | 100 | ..... | 96 | |
| Union Rock Co. (7% serial gold bonds)[18] | Aug. 11 | ..... | 99½ | 101 | |
| Upper Hudson Stone Co. (1st 6's, 1951)[32] | May 24 | ..... | 93 | ..... | |
| Upper Hudson Stone Co. (1st 6's, 1937)[32] | May 24 | ..... | 104 | ..... | |
| Vulcanite Portland Cement Co. (7½% bonds, 1943)[32] | May 24 | 100 | 98½ | 101 | |
| Whitehall Cement Mfg. Co. (common)[36] | Aug. 26 | ..... | 98 | ..... | |
| Wisconsin Lime and Cement Co. (1st Mort. 6s, 1940)[15] | Aug. 31 | 100 | 99 | 101 | |
| Wolverine Portland Cement Co. | Aug. 30 | 10 | 6½ | 6½ | 15c quar. Aug. 15 |
| Yosemite Portland Cement Co. | May 11 | ..... | 7½ | ..... | |

## QUOTATIONS OF INACTIVE ROCK PRODUCTS SECURITIES

| Stock | Date | Par | Price bid | Price asked | Dividend rate |
|---|---|---|---|---|---|
| Asbestos Corp. of Amer. (5 sh. pfd. and 5 sh. com.)[1] | June 22 | ..... | $1 for the lot | | |
| Atlanta Shope Brick and Tile Co.[1] | Nov. 24 | ..... | 25c | ..... | |
| Benedict Stone Corp. (cast-stone) (50 sh. pfd. and 390 sh. com.)[1] | Dec. 29 | ..... | $400 for the lot | ..... | |
| Blue Stone Quarry (60 shares)[2] | Mar. 16 | ..... | $10¼ for the lot | ..... | |
| Coplay Cement Mfg. Co. (common) (4) | Dec. 16 | ..... | 12⅜ | ..... | |
| Coplay Cement Mfg. Co. (preferred) (1) | Dec. 30 | ..... | 70 | ..... | |
| Eastern Brick Corp. (7% cu. pfd.) (1) | Dec. 9 | 10 | 40c | ..... | |
| Eastern Brick Corp. (sand lime brick) (common) (1) | Dec. 9 | 10 | 40c | ..... | |
| Edison Portland Cement Co. (common)[4] | Sept. 11 | 50 | 20c | ..... | |
| Edison Portland Cement Co. (preferred) | Nov. 3 | 50 | 17½c(x) | .. | |
| International Portland Cement Co., Ltd. (preferred) | Mar. 1 | ..... | 30 | 45 | |
| Globe Phosphate Co. ($10,000 1st mtg. bonds, $169.80 per $1000 paid on prin.) | Dec. 22 | ..... | $50 for the lot | ..... | |
| Iroquois Sand and Gravel Co., Ltd. (2 sh. com. and 3 sh. pfd.) (1) | Mar. 17 | ..... | $12 for the lot | ..... | |
| Knickerbocker Lime Co.x | June 22 | ..... | 100 | ..... | |
| Limestone Products Corp. (150 sh. pfd., $50 par, and 150 sh. com., no par) | Dec. 22 | ..... | $60 for the lot | ..... | |
| Missouri Portland Cement Co. (serial bonds) | Dec. 31 | ..... | 104¾ | 104¾ | 3¼% semi-annual |
| Olympic Portland Cement Co. (g) | Oct. 13 | ..... | ..... | £1⅝ | |
| Phosphate Mining Co. (1) | Nov. 24 | ..... | 1 | ..... | |
| River Feldspar and Milling Co. (50 sh. com. and 50 sh. pfd.) (1) | June 23 | ..... | $200 for the lot | | |
| Rockport Granite Co. (1st 6's, 1934)[2] | Aug. 31 | ..... | 90 | ..... | |
| Simbroco Stone Co.[2] | Apr. 20 | ..... | 12 | 12 | |
| Southern Phosphate Corp.[6] | Sept. 15 | ..... | 1¾ | ..... | |
| Tidewater Portland Cement Co. (3000 sh. com.) | Dec. 22 | ..... | $6525 for the lot | ..... | |
| Vermont Milling Products Co. (slate granules) 22 sh. com. and 12 sh. pfd. (6) | Nov. 3 | ..... | $1 for the lot | ..... | |
| Wabash Portland Cement Co.[1] | Aug. 3 | 50 | 60 | 100 | |
| Winchester Brick Co. (preferred) (sand lime brick) (5) | Dec. 16 | ..... | 10c | ..... | |

(g) Neidecker and Co., Ltd., London, England. (1) Price obtained at auction by Adrian H. Muller & Sons, New York. (2) Price obtained at auction by R. L. Day and Co., Boston. (3) Price obtained at auction by Weilepp-Bruton and Co., Baltimore, Md. (4) Price obtained at auction by Barnes and Lofland, Philadelphia, Pa. (5) Price obtained at auction for lot of 50 shares by R. L. Day and Co., Boston, Mass. (x) Price obtained at auction by Barnes and Lofland, Philadelphia, on November 3, 1925. (6) Price obtained at auction by Wise, Hobbs and Arnold, Boston, Mass.

# How National Gypsum Salesmen Sold Their Company's Stock*

WHEN the National Gypsum Co. was organized in 1925, it faced, like all new businesses, the problem of building an adequate financial structure. The organizers showed their faith in the enterprise by backing it with all of the money they could command personally. But since a business of considerable magnitude was being planned, it was not expected that the organizers would furnish all the capital required.

It was the intention of the management to float a stock issue and to market it through an investment house in the usual manner. There was no reason why the company should not have followed the customary procedure. The enterprise was soundly conceived. The men backing it had an extensive experience in the gypsum field and in the wallboard industry. The company owned a valuable gypsum deposit which had recently been discovered at Clarence, N. Y. The most modern plant that the industry had ever known was being erected on the site of the deposit. An inexhaustible market was waiting the company's product.

The set-up was ideal for a stock flotation. With such a property behind the issue, any investment banker would have found it easy to raise all the capital needed.

"We had no thought of selling our stock except through an investment house," explained J. F. Haggerty, president of the company, in a recent interveiew.

"No doubt we would have raised our capital in that manner, had not a different plan presented itself just as we were about ready to complete the financial end of our structure. Our executive and sales personnel is built along somewhat radical lines. Every man in the organization is thoroughly experienced in the gypsum or wallboard industries, or in some kindred line. Men of the caliber we wanted cannot be picked up every day. So we engaged them as we had the opportunity to get them. By following this plan we had several salesmen in our employ a long time before we were ready to operate.

"The question arose what we should do with these men in the meantime. One of our officers suggested that it might not be a bad idea to have them sell our stock. The more we thought about the suggestion, the better it seemed. The men themselves liked the idea. They were so enthusiastic about their new jobs and the prospects of the company that they were anxious to share their enthusiasm with others."

So the men were allowed to try their hands at stock selling. And they succeeded handsomely. The National Gypsum Co. was incorporated on August 29, 1925. The first salesman was hired in October of that year. Gradually other salesmen were engaged until there were twelve salesmen on the payroll. By June 15, 1926, when the company started to manufacture, these twelve men had sold most of the stock issue and had started a momentum which subsequently sold the rest of it. The company now has a capital of $2,350,000 from the sale of this stock, which has a net value in excess of $3,000,000.

Even more significant is the fact that these men sold the stock at a total cost of

*Reprinted from *Advertising and Selling*, May, 1927.

less than 8%. To sell th estock of a new company through customary investment channels often costs up to 40%. Even an established company with a successful business, usually has to pay as high as 15% to secure additional capital.

Remember that the salesmen who accomplished this feat were hired primarily because of their ability to sell gypsum products. None of them had any experience in selling securities.

What these men did is so remarkable that other business men in other fields will be glad to learn the details of just how the National Gypsum financial plan was carried out. It is one of the few instances on record where a reputable, high-grade organization succeeded in financing itself in this manner.

### *Plan of Campaign*

The company confined its security drive to Buffalo, N. Y., and environs. It secured a list of all the automobile registrations in Erie County, down to and including Buick registrations. It was assumed that people who can afford to own high-grade automobiles would have money to invest in an unusually promising local industry.

A series of mailings was sent to these car owners. The purpose of these mailings was to stimulate interest in the National Gypsum Co. and to pave the way for the call of its salesmen. Prospective investors were not bothered with solicitations unless they in some way indicated that they were interested.

For several months, while the stock was being offered to Buffalonians, a long series of advertisements was inserted in two Buffalo newspapers. "The Buried Treasure of Western New York" is the heading that each of these advertisements bore. A subheading, "A series of advertisements revealing the story of a great natural resource—its discovery, its utility and its possibilities," explained the series further. Except for these headings, the copy and illustration was changed with each advertisement.

One of the objects of this newspaper advertising was to arouse local pride in the business being started. "Unfolding the plans for another great Buffalo industry," "A new giant among Buffalo's industries" and "Appraising the Buried Treasure of Western New York" are some of the captions which played up the local pride appeal.

### *Newspaper Advertising*

Another point that was strongly stressed in the series was the fact that all of the organizers of the company were men who had done things in the wall board industry. One piece of copy, headed "A veteran organization under a new name," developed this argument in the following forceful way:

A new corporation does not always mean a new organization. There are occasions when veterans seek new fields. A very old company may have at its head very new men. The management of a new concern may wisely have at its head the veterans of an industry.

The National Gypsum Co. is manned by many of the veterans of the wall board industry. Their knowledge, experience and research was responsible for the early success of many concerns in the business. Their association with the National Gypsum Co. comes as a broader opportunity to further develop this industry under conditions and with facilities unequaled in gypsum trades.

The largest and most modern wall board unit ever constructed has been put at the service of these veterans.

Still another interesting feature of these advertisements is the information they presented to the people of Buffalo about the rich gypsum deposits that lie at their doors. The chances were that the average citizen of Buffalo knew nothing about this natural resource of western New York.

Readers are told further that the acreage which the company owns is undoubtedly the last available deposit of high-grade gypsum in western New York, but that this deposit is so extensive that it will last for at least 75 years.

### *Selling the Company's Prospects*

Another argument that was brought out in most of the advertisements concerns that market that exists for gypsum products and of the company's ability to reach this market. The following paragraphs explain this point so effectively that they are worth quoting in part:

America has always been a nation of salesmen. We sell our products effectively to the world when desirable, and efficiently to each other continually.

Not only has American business successfully sold its basic products but we have never lacked for the ingenuity to create new products and new uses for them.

The most valuable single commodity in America is an effective sales organization.

The National Gypsum Co. will make a line of gypsum products. It already has at its command a sales organization with a background of years of successful selling in this field. The individual sales performances of these men in years past probably exceeds what will be required of them in the marketing of National wall board and other gypsum products.

But the gypsum products now in the hands of the building trades only indicate and in no way measure the future probabilities of other gypsum products demanded by American builders and possible for a concern whose gypsum properties are adequate in quantity and quality.

The advertisements did not mention the sale of stock. Two or three of them suggested that an opportunity was being given to Buffalo investors to share in the profits that would accrue from the development of the Clarence gypsum deposits. All of the advertisements offered a booklet, "Gypsum: An Industrial Romance."

The inquiries received for this booklet were followed up by the salesmen. Of course, many of these inquiries came from persons who were interested in gypsum as a commodity rather than as an investment. Nevertheless, these advertisements, regardless of the number of direct inquiries they produced, did succeed in making the new company thoroughly known locally. Hence they were a powerful accessory in the campaign.

### *Talking "Gypsum"*

These advertisements have been referred to somewhat in detail because it happens that the salesmen in their talks with investors presented their proposition in the spirit of the newspaper copy. They talked the gypsum industry, its future, the prospects of the National Gypsum Co. and the history of the men who were behind it. They told why they had cast their fortunes with this new company. They explained that they were merchandise salesmen and not security salesmen. They obviously knew little about finance or selling stock, but quite clearly did know a great deal about the industry with which they were associated. As was to be expected, they won the confidence of the investors to whom they talked and so imbued them with their enthusiasm that the stock of the company was very quickly marketed.

On June 15, 1926, the salesmen stopped selling the company's stock and started to sell its regular product. They are still at it. The number of salesmen has since been increased to 30. The marketing plan was in complete readiness by the time the company was ready to operate. For months meetings were held every Saturday, in which the salesmen and the company's sales department executives participated. At these meetings, which were held in a spirit of good fellowship, sales policies and sales methods were established.

Thus the company's marketing plan was carefully prepared by men who had spent the better part of their business lives in the building supply industry. It is no wonder, then, that the National Gypsum Co.'s marketing schedule bears none of the earmarks of immaturity so commonly found in sales plans that are hurriedly made to order while the salesmen are packing their trunks and waiting for their tickets.

It is also not surprising that the company, in view of the thoroughness of its preparation, has been running up records since it started operation less than a year ago. It already has splendid distribution throughout the east and is rapidly extending its distribution throughout other sections of the country. It has acquired another valuable gypsum deposit at National City, Mich., where a second plant is being put in operation.

To sum up, it would seem as though the National Gypsum Co. has established a precedent in financing which any legitimate business might emulate. After all, who is better able to present the merits of a proposition to an investor than the salesmen who are selling the product? Salesmen play a large part in the success of any manufacturing business. Its success is due, in a big measure, to their selling ability. Is it not logical, therefore, to suppose that those same salesmen would be able to sell other things that their house may have to suffer, such as a stock issue?

## Another Ohio Cement Plant Rumored

A DAYTON, Ohio, realty firm, said to be acting as agent for the Southwestern Portland Cement Co. which already has two portland cement plants in Ohio, is reported by the *Dayton News* to be purchasing farms near Spring Valley, Ohio, along the Pennsylvania railroad in the direction of Xenia. The paper reports that a number of options have been secured and that in some cases as much as $400 per acre was offered for whole farms.

## Asbestos Plant to Add Wealth to North Carolina

INDICATIONS are that another mineral of North Carolina will find a more important place in industry with the completion of developments that have been announced recently.

A plant for the preparation of asbestos for the market is being erected by the National Asbestos Co. at Minneapolis, Avery county. The plant is to have a daily capacity of 30 tons, and according to word received from D. T. Vance, a member of the firm, prospects for its successful operation are bright.

There are a number of deposits of the mineral in the mountains of this state, probably the largest and most promising being one within three miles of the new plant.

North Carolina, in 1919, according to State Geologist H. J. Bryson, held third place in asbestos production in the United States, but at that time all of the material was shipped into other states in a crude form. In late years deposits of asbestos have been found in Ashe, Yancey, Avery, Caldwell, Macon, and Jackson counties.

"The type of asbestos which will be mined at Minneapolis," says Geologist Bryson, "is the Amphibole variety, which is quite different from the Chrysotile mined in Canada. The Canadian material is of a higher grade and can be used for many more purposes than the North Carolina asbestos.

"The price of asbestos varies from $20 to $700 per ton, according to the length and strength of the fiber. The principal uses of the North Carolina variety are asbestos cement products, asbestos shingles, heat insulating cements, ingredients for paints, filtering and packing."

## Lehigh Said to Be Seeking Site in Georgia

IT is reported by the Atlanta, Ga., *Georgian* that a representative of the Lehigh Portland Cement Co. has been in Georgia recently looking over the state for a location for a cement plant.

The Lehigh company is one of the largest producers of portland cement in the United States with central offices in Northampton, Penn., and plants in many parts of the country. Its nearest plant to the Atlanta district is in Birmingham, Ala.

## To Decide if Drainage Board May Dredge Sand

A CASE involving the right of bodies legally formed to do a specific work to go outside of that work and enter one of the rock products industry has been recently brought before the supreme court of Kansas.

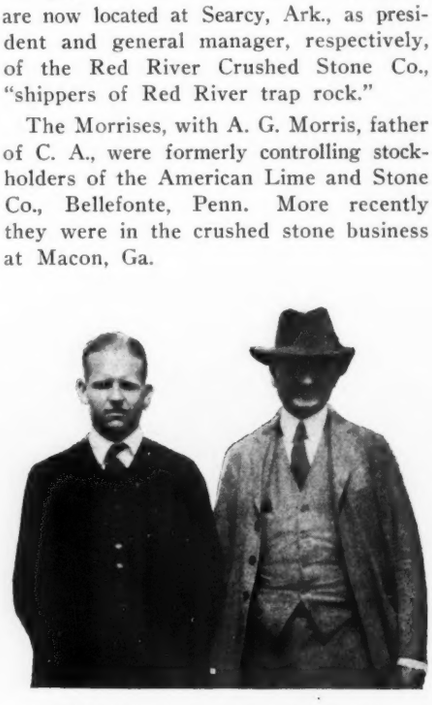
The Kaw Valley drainage board, which was formed primarily to build levees and make other improvements along the Kaw river, has been for some time past operating a sand dredge and is attempting to pay a part of the cost of the improvements it is making by the sale of sand. The right of the board to go outside of the work which it was legally formed to carry on has been questioned, taken through the lower courts and now is before the supreme court. According to the *Kansas City* (Kas.) *Kansan,* a decision is expected shortly.

According to advices received from Kansas City, the drainage board recently made improvements in its sand plant and prepared to go into the business on a larger scale than before.

## C. A. and E. L. Morris Locate in Arkansas

CHARLES A. MORRIS writes that he and his son E. L. Morris ("Bud") are now located at Searcy, Ark., as president and general manager, respectively, of the Red River Crushed Stone Co., "shippers of Red River trap rock."

The Morrises, with A. G. Morris, father of C. A., were formerly controlling stockholders of the American Lime and Stone Co., Bellefonte, Penn. More recently they were in the crushed stone business at Macon, Ga.



*E. L. Morris* *C. A. Morris*

## Michigan Gypsum Co.'s Mill Damaged by Fire

DAMAGE that may exceed $40,000 resulted recently when fire destroyed a portion of the Michigan Gypsum Co.'s plaster mills just outside of Grand Rapids, Mich. The firemen's report states that the fire was caused by an overheated electric motor on the third floor of the structure. The building was unoccupied at the time.

Diligent work of the fire fighters confined the damage to one section of the mill. According to J. C. Corcoran, manager of the plant, operation of the plant will continue in part without any shutdown. Reconstruction of the damaged portion will be started as soon as possible.—*Grand Rapids* (Mich.) *Herald.*

## New Georgia Gravel Plants To Be Built

GEORGIA local papers report that a new gravel field has been found near Swainsboro, Ga., and that two plants will be built to work it. One of these will be erected by J. D. Twiggs, of Augusta, the other by J. A. Coleman, of Swainsboro. The land is about five miles from Swainsboro and it is expected that a railroad will be laid to connect the plant with the nearest main line.

Georgia has a limited production of coarse concrete aggregate and road material and an especially limited production of gravel. As the state is preparing to built concrete roads, the discovery is considered very important.

## W. R. Harris Joins Cincrete Products Corp.

WALLACE R. HARRIS, a well known authority on concrete products, has joined the organization of the Cincrete Products Corporation as engineer. He was at one time engineer of the cement products bureau of the Portland Cement Association. While editor of *Concrete Products,* Mr. Harris investigated the subject of cinder concrete building units (Cincrete) and was the first editor to give recognition to it as a building material.

His new duties will be to co-operate with architects and engineers in solving problems in concrete construction, more especially those in which Cincrete units can play an important part. Mr. Harris is now president of the American Association of Engineers, having filled in succession every elective office in that organization. He is also a member of the Engineering Institute of Canada, Western Society of Engineers, Illinois Society of Engineers, Society of American Military Engineers, Engineers and Architects Club of Louisville, American Concrete Institute, National Fire Protection Association, American Road Builders Association and other organizations. He has been active in Builders Exchanges.

## State Must Collect the Royalty on Oregon Stream Gravel

ATTORNEY GENERAL VON WINKLE of Oregon says that it is mandatory that royalties be collected on sand and gravel taken from the Columbia and other navigable rivers within the state, and applied to the common school fund.

According to the *Oregon Daily Journal*, the waiving of payments by the state land commission, which was one of the arguments advanced by producers for a lower royalty, was illegal. A review of the meeting between the producers and the land commissioners of both Oregon and Washington was given in the August 20 issue of ROCK PRODUCTS. The producers stated then that an attempt to collect this waived royalty would so seriously embarrass them as to put some of them out of business.

The royalty is 10c. per yard and the producers affected claim that so high a royalty is beyond the power of the industry to bear. It is much higher than the depletion charge which must be made by producers who work privately owned deposits, which would tend to substantiate this claim.

A recent newspaper report says that the royalty due to both states is $164,000.

## Two Gravel Companies Opening Pits at Eagle Lake, Texas

DEVELOPMENT of gravel pits at Eagle Lake, Texas, has received considerable impetus because of the freight differential from that place to points in the eastern part of the state. Gemmer & Tanner Co. has nearly completed its new plant and expects to start shipments within a few weeks. Another pit has recently been opened at Eagle Lake by Horton & Horton, the reason being chiefly one of lower freight rates to markets. —*Columbus* (Tex.) *Citizen*.

## West Virginia Sand Company Increases Capital

THE Ohio Valley Sand Co. has recently increased its capital $300,000 to buy new equipment and otherwise increase its business, according to local papers.

The company is located at New Martinsville, W. Va., and its officers are: J. U. Dayton, president; Dr. E. E. Fankhauser, vice-president; David I. Fisher, treasurer, and J. W. Harman, secretary and manager.

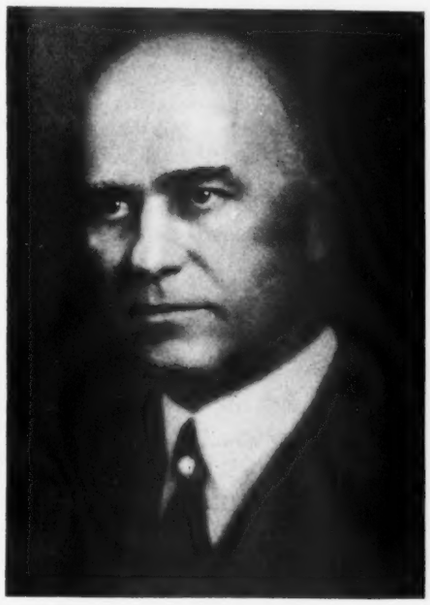
## Pacific Lime Co. Opens Mixed Mortar Plant

THE Pacific Lime Co., one of the largest lime producers on the Pacific coast, has completed the erection and equipment of its new ready-mixed mortar plant on Granville Island, British Columbia. The company proposes to market its products through established building material dealers exclusively. —*Vancouver* (B. C.) *Journal of Commerce*.

## Duff Abrams Will Represent Cement Manufacturers at Berlin

IN order to study recent developments in the manufacture and use of portland cement abroad, Prof. Duff A. Abrams, director of the department of research of the International Cement Corp., sailed recently for Bremen abroad the United States Line's S.S. *George Washington*.

He will represent the International Cement Corp. at the fiftieth anniversary of the Association of German Portland Cement Manufacturers. This convention will be held at Berlin, August 28 to 31, and in addition to representing the International corporation Prof. Abrams will act as the official delegate of the American Portland Cement Association.



***Duff A. Abrams***

As a supplementary program of the convention, visits will be made to German cement plants in the territory from Dessau to Heidelberg.

The International Congress of Testing Materials will be held at Amsterdam, September 12 to 17, and at this meeting Prof. Abrams will also do double duty, representing the International corporation and acting as the official delegate of the American Concrete Institute, of which he is vice-president.

During his three months' trip Prof. Abrams will visit research laboratories of cement and other industries as a part of a comprehensive study of this phase of manufacturing practice abroad. This study will include plants in Belgium, France, Switzerland and England.

Prof. Abrams' visit should not alone be of great value to the International Cement Corp. and the industry as a whole, but it no doubt will foster more friendly relations with European manufacturers.

## National Cement Employes Hold Annual Picnic

CELEBRATING the splendid record for the first six months of the year, the vice-president of the National Cement Co., Ralph E. Nicholson, entertained employes of the plant at Ragland, Ala., with a picnic and barbecue recently.

Approximately 1000 people watched and took part in running, jumping and boxing exercises. Barrels of lemonade and hundreds of pounds of barbecued meat with ice cream and favors for the children rounded the day into a perfect outing. The negro employes were entertained on their own grounds.

Almost all branches of the company's plant were shut down for the day.—*Birmingham* (Ala.) *News*.

## Who Is Damaged by Right-of-Way Over Gravel Land?

A CASE which may be carried to the Illinois supreme court, from Lincoln county, will help to decide on the rights of a qualified ownership in gravel lands. The Lincoln Sand and Gravel Co., of Lincoln, Ill., purchased land from the heirs of an estate with the provision that when all the sand and gravel had been removed the title to the land would revert to the original owners. A right-of-way has been taken through the land by the Lower Salt Creek drainage district and damages which are to be paid for this right of way are claimed by both the gravel company and the heirs to the estate. Litigation has been going on for some time past.

According to the *Springfield* (Ill.) *State Register*, the judge of the county court has ruled that the gravel company had a determinable or qualified ownership in the land which was subject to the right of the heirs of the estate to pasture or otherwise use such part of the land as was not needed for gravel production. The inference would seem to be from this that either or both parties to the suit might have been damaged. The question of who has been damaged and how much was left to a jury to decide.

## New Type of Crusher Reported From Oregon

IT is reported that a new type of rock crusher has been developed in Oregon and that one of the first machines of this type has been installed in the quarry of Hillstrom Bros., in Currey county, where it is used to make road stone and similar products.

According to a dispatch in the *Portland Oregonian*, the new crusher crushes by stamping instead of compressing the rock. It is called the Latture crusher from the name of the inventor, who is manufacturing it in Portland.

# Shall We Hang Together or Hang Separately?

## Details of the American Lime and Stone Co.'s Mine-Wage Settlement

By Charles Warner
President, Charles Warner Co. and American Lime and Stone Co., Wilmington, Del.

IN early American history, during our strife with England, hanging was a frequent practice to snuff out the lives of those who were opposed to England's rule. At one time there were many differences among the American patriots as to the course they should pursue. One of these early Americans coined the phrase:

"If we don't hang together, we will hang separately!"

Leaving out the question of taking human life, this sentiment definitely applies to our modern industrial life, where business enterprises are often-times engaged in severe trade struggles. When these periods strike a business organization, the surest road to success lies in having every man and woman in the organization fully advised of the facts and anxious to do everything possible, even to the extent of personal sacrifice at times. In the Warner companies we are sure to have these struggles at times, and we will face this same issue of hanging together, as did the early American patriots.

We have a situation at this moment, wherein the many manufacturers of lime and stone products similar to the materials we are making at the American plants at Bellefonte and Union Furnace, are engaged in an aggressive trade struggle. There is overproduction and aggressive price cutting, and the industry as a whole is going through a severe period. This is true also of most of the larger industries in this country and the next few years will probably see a struggle for existence on the part of many industrial organizations. The result of all this is to benefit the consumer but only those plants which are strategically located, working under the most economical conditions and having the best team work among the employes will be able to make profits.

### *Best Team Work from Understanding*

The best team work is found in those organizations where there is reasonable co-operation between the men and the management, so that all may understand the company's problems and are willing to take off their last shirt to bring the company through successfully, and with the least losses. In the long run, this means more continuous employment, and a larger aggregate income for the year to the employes whose organization loses the least time and money during the struggle.

Our management does its best at such times not to make payroll reductions on the hour rates unless it seems to be a very necessary step.

We are all anxious to maintain the American standards of living. Most of us have been helped by the fact that there has been a reduction during the past year in the prices of many things we consume. The Government and private records definitely show that the average price of commodities which we consume has dropped approximately 10% during the past year, and to a greater or lesser extent we are all benefiting by this reduction of prices.

The American company has experienced this same condition. It is selling its products in highly competitive markets, and it is receiving approximately 10% less today than it did a year ago for the same quantity of materials. Fortunately, the demand and market conditions in most of the territory in which the Warner company is directly interested are in better shape.

Under these conditions, the management of the American company has been forced to study every possible economy. Substantial savings have been made in many other ways to help meet some of this heavy reduction in the selling prices of our products. An analysis of the payroll situation showed that in the operation of the company's mine at Bellefonte, the rates of pay appeared high in view of the reduction in hazards to life and limb, the continuous employment without interference by outside weather conditions, the comfortable, uniform temperature conditions, and other advantages. The mine costs had risen somewhat, and it became an imperative company policy to get these costs down to a basis upon which the company could live and maintain full operations of its plant. There should be no question about the advantage to the company and employes alike in maintaining full operation of plants and larger total payrolls per annum rather than part-time operations, which have prevailed so much in the coal regions and in other industries, and which to some extent affected our own operations for awhile at Bellefonte during the spring.

### *Miners' Committee Helpful*

The new wage scale which the local management recently issued at Bellefonte for these particular groups of mine operators was not favored by the men. This was probably natural, since they did not fully understand the problem the company was up against. A discussion between the miners' committee and the management cleared up many points and disproved the false rumors that had been circulated regarding the company's situation. The miners' committee took an active and helpful part in discussing the broad proposition that it was necessary to reduce the costs of stone delivered from the mine. They suggested several ways to improve costs without reducing the wage scales. The management immediately realized that this mining group was showing an active interest in the company's problem beyond the mere question of performing their labor; that if this active interest could work out constructively to reduce the mine costs, without reducing the wage rates at this time, we would have accomplished real co-operation between men and management, which would benefit both interests.

It was, therefore, decided to allow a two-months' period to determine whether the men and the management, by working shoulder to shoulder in reducing costs, could effect the saving that must be made in other ways, if not by wage reductions. We all sincerely hope that this result can be accomplished.

I feel that this incident promises to be a distinct step forward, by gaining increased efficiency through direct co-operation. In the end we will all gain by this policy, if carried out honestly and sincerely, and we are directly assisting our company to meet the severe trade conditions that are existing, and to maintain full operation of our plants, with maximum annual payrolls.

### *Editor's Note*

***ONLY after much persuasion did Mr. Warner consent to our reproduction of this message from the "Warner-American News," a house organ limited in its distribution to employes of the Warner-American companies. We wanted to reproduce it because it supplements the news item on p. 86 of Rock Products, August 20, 1927, entitled "An Experiment in Cost Reduction."***

***No business man likes to air his troubles and problems in public; we presume, because under present standards of business ethics and severity of competition business competitors may take unfair advantage of him.***

***Therefore we cannot but admire Mr. Warner's breadth and tolerance, and we are certain that such business men as he are having a great influence in maintaining our prosperity and in doing away with "secret diplomacy."***

***Unfortunately international goodwill and political efficiency are as greatly hindered by want of such frankness, as American business has been benefited by it. May we have eventually such business men in government!—The Editor.***

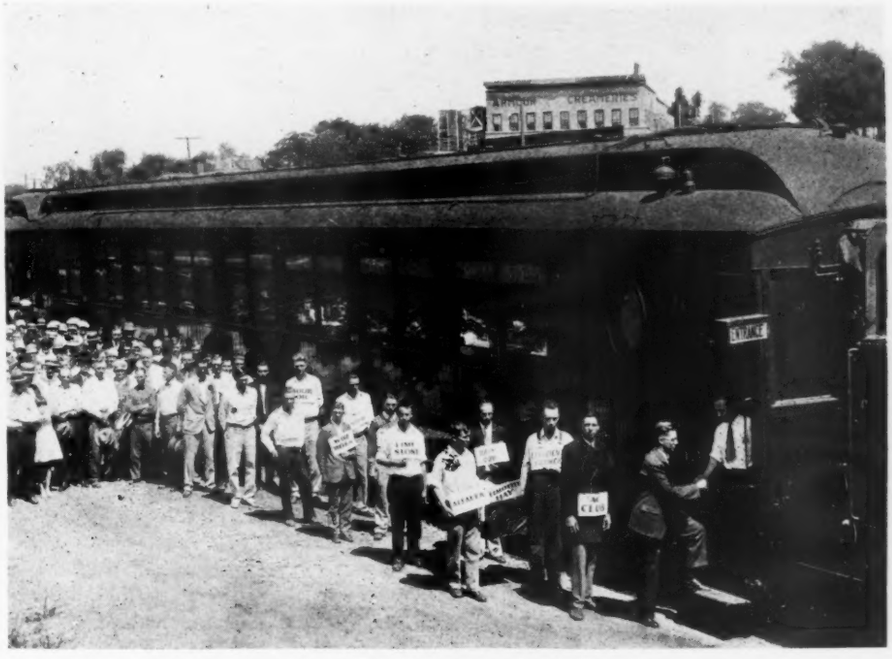
# Agricultural Limestone Special Completes Tour

## Five-Car Soil-Testing Train Makes 48 Stops in Iowa and Missouri

THE first soil-testing train ever operated west of the Mississippi river recently completed a tour of 22 points in northeast Missouri and 24 points in southern Iowa. This five-car special train was operated by the Chicago, Burlington and Quincy railroad, in co-operation with the agricultural colleges of these states to give assistance in soil problems. Exhibits were prepared by the colleges showing how soil sourness can be neutralized cheaply and good stands of clover and other legumes obtained by the use of ground limestone. The agricultual colleges of Iowa and Missouri have been encouraging the lime and legume program for a number of years as a means to greater soil fertility and more profitable farming. It is a program based on proven facts.

A laboratory car which contained all necessary equipment for making a thorough analysis of soils was one of the features of the train. Farmers who desired to know the present condition of their land were invited to bring samples of their soils to this traveling laboratory for testing. In Missouri 413 farmers brought in a total of 797 samples; in Iowa 884 soil tests were made, making a total of 1681 soil tests which were made in the presence of the farmers who brought in the samples. Approximately 90% of these samples tested sour and required from one to as much as four tons per acre to correct the acidity. A conference car was maintained in connection with the laboratory car, and crops and soils specialists held individual conferences with a large number of farmers on soil and drainage and seeding problems. Farmers were advised where lime could be secured most advantageously. Contracts were signed with 88 individual farmers for establishment of legume demonstrations in Missouri, one or more demonstrations being established at each point where the train stopped. These demonstrations will be followed up carefully by college extension forces and every effort made to see that they are successful in the future work.

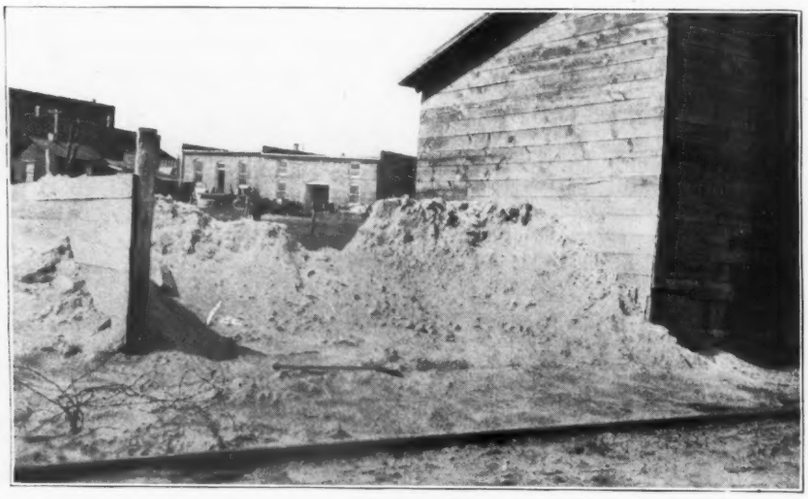
Splendid work was done by local committees in preparing for meetings at every stop of the train. Talks were given by college representatives who emphasized the importance of leguminous crops in restoring soil fertility and retarding erosion, and the value of these crops in live stock production.




*The pageant, "The Funeral of Timothy Hay," presented by Iowa schoolboys at several towns*


*Interiors of two of the cars on the "lime and legume" special train*

In many places the committees had arranged all-day programs with picnic dinners, foot races, tennis tournaments and band concerts. At Lean and Lamoni, Iowa, the Agricultural Club of the Vocational Agricultural Department of Lamoni high school presented a pageant entitled "The Funeral of Timothy Hay," which was entertaining as well as educational. Business windows in many towns were beautifully decorated with exhibits setting forth the value of lime and legumes as a foundation for prosperity. Home-made limestone spreaders, built by vocational agriculture teachers and their classes, were shown in use at a number of points and sold at the close of the meetings to the highest bidder. The International Harvester Co. displayed one of its lime spreaders at each stop, and the Holden lime spreader was also displayed at a number of points. Business men in all lines cooperated enthusiastically. At many points the expression was made locally that the coming of the train and the presentation of the program was the most practical and valuable event staged in the community for years.



***An open lime storage bin at Bogard, Carroll County, Mo., owned and operated by the Farmers' Union***

The campaign was planned and directed by J. M. Lamson of Chicago, who has charge of agricultural development work carried on by the Burlington, and Walter B. Remley of St. Louis, agricultural agent for the Burlington at that point. Val. Kuska of Omaha, colonization agent for the Burlington, also assisted in arrangements and accompanied the train on its tour. Specialists sent out by the extension service of the Missouri College of Agriculture, to conduct the lectures, soil tests and conferences on the train in Missouri, included P. F. Schowengerdt, C. E. Carter, O. T. Coleman, B. B. Branstetter, R. J. Silkett, K. G. Harman and Ida P. Trotter. Members of the Iowa State College extension forces who accompanied the train in Iowa were: J. L. Boatman, F. G. Churchill, E. S. Dyas, M. A. Hauser, Rex Beresford, B. J. Firkins, Don Fish and H. L.

RECORD FOR SPECIAL MISSOURI LIMESTONE TRAIN

| | Demonstrations | Attendance | Tests | Acres represented | Farmers |
|---|---|---|---|---|---|
| Pattonsburg | 6 | 471 | 27 | 375 | 11 |
| Gilman | 3 | 264 | 22 | 750 | 17 |
| Trenton | 9 | 230 | 39 | 413.5 | 29 |
| Gault | 7 | 963 | 66 | 838.5 | 47 |
| Milan | 1 | 299 | 26 | 270 | 14 |
| Green City | 3 | 259 | 14 | 262 | 9 |
| Novinger | 3 | 174 | 23 | 235 | 8 |
| Kirksville | 3 | 332 | 5 | 111 | 12 |
| Brashear | 1 | 363 | 15 | 393 | 7 |
| Edina | 5 | 200 | 46 | 800 | 16 |
| La Belle | 6 | 133 | 27 | 737 | 19 |
| Maywood | 1 | 101 | 12 | 32 | 3 |
| Kahoka | 3 | 358 | 11 | 218 | 9 |
| Granger | 3 | 245 | 55 | 714 | 28 |
| Memphis | 7 | 304 | 79 | 1,401 | 29 |
| Downing | 3 | 219 | 25 | 386 | 14 |
| Lancaster | 4 | 143 | 37 | 252 | 16 |
| Unionville | 3 | 440 | 55 | 996 | 24 |
| Macon | 3 | 115 | 42 | 526 | 18 |
| New Cambria | 7 | 612 | 94 | 2,305 | 46 |
| Clarence | 5 | 385 | 41 | 586 | 20 |
| Shelbina | 2 | 520 | 36 | 863 | 20 |
| Totals | 88 | 7,130 | 797 | 13,464 | 413 |

REPORT OF THE IOWA "LIME AND LEGUME" SPECIAL TRAIN

| Stop | Soil Tests | Attendance | Cars Lime Given Away and Other Details |
|---|---|---|---|
| Mediapolis | 15 | 326 | Band. River Products Co. of Iowa City and Linwood Cement Co. of Davenport each gave away car of lime. Lime to be stocked by Farmers Elevator. |
| Winfield | 35 | 125 | Band. Linwood Cement Co. gave away car of lime. Farmers Elevator Co. to stock lime. |
| Brighton | 28 | 231 | Band. Refreshments. Linwood Cement Co. gave away car of lime. |
| Hedrick | 6 | 130 | Demonstration of lime spreader. Linwood Cement Co. gave away car of lime. J. H. Meier of Hedrick may stock lime. |
| Danville | 33 | 331 | Many prizes by merchants. Band. Linwood Cement Co. gave away car of lime. A. G. Rice, sand and gravel dealer of Danville, to stock lime. Dehner Seed Co. to stock it in Burlington. |
| Mt. Pleasant | 76 | 316 | Band. Car lime given away by Linwood Cement Co. Lime stocked by both A. D. Hayes Elevator Co. and Farmers' Union. Also in county at New London by A. D. Hayes Elevator Co. and at Wayland and Olds by Farmers Elevators. |
| Stockport | 39 | 519 | Band. Town decorated. All-day program. Car lime given away by Linwood Cement Co. |
| Libertyville | 36 | 252 | Band. Car lime given away by Linwood Cement Co. Farmers' Union Store and A. H. Miller Elevator both interested in stocking lime. |
| Ottumwa | 50 | 1031 | Band, window displays and all-day program. Seven cars lime and 2 pressure cookers given away. Conferred with lime storage committees from Ottumwa, Bidwell, Chillicothe and Lakesburg. Will have later meeting with all railroads in county on storing lime. |
| Albia | 6 | 385 | Band. Linwood Cement Co. gave away car of lime. Conferred with committees from Albia, Melrose and Bussey on storing lime. |
| Chariton | 38 | 310 | Band. Singing by Dillman sisters. Car lime given away by Linwood Cement Co. Conferred with lime storage committees from Lucas, Oakley and Russell. |
| Osceola | 27 | 300 | Band. Car lime given away by Linwood Cement Co. |
| Greenfield | 30 | 307 | Band. Lime spreaders on display. Conferred with lime storage committee from Bridgewater. |
| Cumberland | 38 | 836 | Band and all-day program. Conferred with lime storage committees from Wiota, Atlantic, Marne, Massena, Lewis, Griswold and Anita. |
| Creston | 45 | 207 | Band. No conferences on stocking lime. |
| Bedford | 21 | 764 | Band. Harry L. Evans will take up with Bedford Community Club about stocking lime. |
| Diagonal | 41 | 333 | Band. Conferred with lime storage committee from Ellston, Beaconsfield, Delphos, Redding Maloy, Shannon City, Clearfield, Benton, Blockton, Mt. Ayr, Diagonal and Kellerton. |
| Humeston | 42 | 325 | Band. Free lemonade. Window decorations. Lime to be stocked at Humeston by Humeston Elevator Co. Conferred with Maurice Brown of Garden Grove about stocking lime there. |
| Leon | 28 | 206 | Band. "Funeral of Timothy Hay" presented by Agricultural Club of Lamoni High School. Conferred with committees on lime storage from Crown and Van Wert—practically assured at latter place. |
| Lamoni | 51 | 1200 | Band. Refreshments. Business houses closed during afternoon. "Funeral of Timothy Hay" presented by Agricultural Club of Lamoni High School. Lime to be stocked by B. D. Fleet Co. and Supply Store co-operating. |
| Corydon | 80 | 250 | Car lime given away by Linwood Cement Co. Elevator has stocked lime. |
| Centerville | 11 | 864 | Band. Alfalfa Hay Show. Local pulverizer and lime spreader demonstrations. Wells Township Farm Bureau presented "Hiram's Hired Hands." Many business windows decorated. Linwood Cement Co. gave away car of limestone. Conferred with lime storage committees from Mystic, Cincinnati, Exline, Plano, Sedan and Udell. |
| Bloomfield | 48 | 647 | Band. Linwood Cement Co. gave away car of lime. Conferred with lime storage committees from Bloomfield, Pulaski and Drakesville. |
| Donnellson | 60 | 811 | Band. Car lime given away by Linwood Cement Co. Conferred with lime storage committees from Donnellson, Sawyer, West Point, Wever, Mt. Hamill and Argyle. Henry Trump, lumberman at Donnellson, will stock it. |
| Totals | 884 | 11,006 | Cars of Lime Given Away — Lime storage bins definitely arranged |
| Average | 36.83 | 458.33 | 23 by Linwood Cement Co. of Davenport, River Products Co. of Iowa City and other quarries. — 8 |

Eichling. Ora Rhodes and Everett Saylor, 4-H Alfalfa Club champions of Iowa, from Decatur county, accompanied the train in Iowa and presented a demonstration at each point.

In Missouri, 7130 people passed through the train, and in Iowa, 11,006, making a total of 18,136 people who viewed the exhibits which were carefully explained by the agricultural college representatives. There is little doubt that a large number of those attending the meetings will use limestone and sow legumes. Walter B. Remley, who had charge of the train, advises that some immediate results are even now evident, seven carloads of lime being ordered at one point during the first week following the operation of the train. At another point, 636 tons of limestone have been sold to farmers since the visit of the train. None of these farmers had ever used lime before.

"The operation of this train was the result of a survey which we made several weeks ago," states Mr. Remley, "when leading farmers and business men reported that the sour, depleted condition of the soil in these sections was making it almost impossible for farmers to grow clovers and similar legume crops necessary as feeds and soil builders in a well-ordered, profitable farming system. It was also found that a great many farmers who needed lime were finding it hard to secure because it was not stocked at their trading points. Of course, the value of limestone in correcting soil acidity is well known. The greatest difficulty has been to get it. Previous to the operation of this train, stocking of lime was brought about by local co-operation at 16 of the 22 stops made in Missouri. Conferences were held during the campaign with lime storage committees in the various communities. At some stops we had conferences with committees from as many as ten communities. In Iowa several quarry companies co-operated in the campaign by giving away cars of limestone; a total of 23 cars were given away in drawings at various places. Lime storage was definitely arranged during the campaign at eight points in Iowa. Doubtless the conferences held will result in the storing of lime in a good many other communities. Inexpensive storage bins were advocated on the train. Although covered bins have been built at numerous points, as a rule the cost of such bins is too high to warrant the extra expense. In spite of some disadvantages, open storage bins have proven satisfactory. Bankers, chambers of commerce, business men's clubs, farm organizations, elevator companies and others are taking the lead in providing storage bins. The city council of one Missouri city even appropriated money to erect and stock a lime storage bin. In other places the money needed was raised by popular subscription. The practice of storing lime is now rapidly increasing in territory served by the Burlington. As an example of what is being accomplished and what may be expected in many localities, the 10 storage bins established early in 1926 in Linn county, Missouri, increased the tonnage used in that county from 390 tons in 1925 to 2650 tons in 1926, and the number of farmers using lime increased from 56 in 1925 to 224 in 1926."

***Open lime storage bin at Browning, Linn County, Mo. This is one of 10 bins in this county stocked and operated by the Linn County bankers co-operating with the Linn County Farm Bureau***

The reports of the special train are given in the tables on the preceding page.

## Rock Dusting Coal Mines Must Be Thorough

UNDER the title, "Rock Dusting Coal Mines Saves Lives, but Must Be Thorough," the Bureau of Mines, Department of Commerce, has issued a bulletin (dated July 16) giving actual experience with rock dusting in a number of coal mines. The author, Scott Turner, director of the Bureau, points out that rock dusting may be worse than useless if it is not done adequately and systematically, because it gives a false and unwarranted sense of security.

As showing the benefits of thorough rock dusting, Mr. Turner states that no explosions have occurred in French coal mines in the ten years that thorough rock dusting has been required by law. In British coal mines, which have been required to use rock dust since 1921, there has been but one major explosion, except a recent gas explosion which would have been a terrible disaster if rock dusting had not been used.

### *Imperfect Dusting of Little Use*

In the bituminous mines of the United States from January 1, 1926, to May 1, 1927, there were 16 major disasters, in each of which more than five men were killed. Two other incipient explosions in rock-dusted mines killed four men and one man, respectively. In all these explosions, 438 men were killed. Eight of the mines were rock-dusted, at least in the vicinity of the origin of the explosions of gas or coal dust; and this rock dust, by extinguishing the flames, localized or aided in localizing the explosions. Fifty-seven were killed by these incipient explosions, but 1892 men who were exposed to the liability of death escaped. According to the testimony of state mine inspectors, of mine operators and of Bureau of Mines investigators, it is probable that a large proportion of these men would have been killed had it not been for rock dusting.

Two other explosions, occurring in partly or imperfectly rock-dusted mines, killed 131 men out of 173 who were in the mines. If rock dusting is not efficiently done and maintained up to an approved standard, in parallel air passages as well as haulageways, it is not effective.

During this same period, January 1, 1926, to May 1, 1927, eight explosions occurred in non-rock-dusted mines, killing 244 men out of 761 in the mines.

### *Comparison of Dusted Mines with Undusted Mines*

It seems clear that, from an explosion-risk standpoint, partly or imperfectly rock-dusted mines class with non-rock-dusted mines. On this basis, there have been, since January 1, 1926, ten major explosions in partly rock-dusted mines and non-rock-dusted mines, in contrast with seven explosions of a limited character in rock-dusted mines. In the former, 555 men out of 934, or 60% of the men in the mines, escaped, whereas in the rock-dusted mines, 2078 out of 2135, or 97% of the men in the mines at the time of the explosion, escaped death.

These figures clearly show the merit of rock dusting. The method will not prevent local gas explosions, but if properly done and maintained, according to Bureau of Mines standards, there can be no doubt of its success in preventing great, widesweeping coal-dust explosions that destroy numerous lives and a vast amount of property. The cost of rock dusting is comparable with accident insurance premiums, apart from the humanitarian and psychological value in saving time and improving morale in coal mining.

# Foreign Abstracts and Patent Review

**Chemical Removal of Impurities from Rocks and Minerals.** The disintegrated material is placed in a suitable container and treated with a mixture of fairly strong sulphuric acid and hydrochloric acid and then oxalic acid in an amount determined by the impurities in the mineral is added. The vessel and contents are brought to a boil and kept thus for ½ to 1 hr.; the top liquor is decanted and the residue boiled once or twice with clean water and finally washed with cold water. The purified mineral can be dried and ground to desired fineness. Sulphuric acid may be used with common salt in place of the above process and action may be carried on in the cold on the disintegrated material, stirring being accomplished by compressed air. *English Patent No.* 258,246.

**Thermal Analysis of Gypsum Dehydration.** Test samples of fine ground gypsum and of amorphous silica calcined at a temperature of 1100 deg. C. were heated in an oil bath at various temperatures (2.5 to 25 deg. per minute) and the interval temperatures noted. The temperature of formation of plaster of paris increases with the rate of heating, but the temperature of formation of anhydrite is not affected by this factor. *Comptes Rendues* (1927), **184,** 970-72.

**Limestone Calcination in Vertical Gas-Fired Kilns.** The gas is burned under pressure in mixing burners with sufficient air for complete combustion and the products of combustion injected into the kilns through nozzles with a kiln temperature of about 900 deg. C. *English Patent No.* 246,485.

**Improved Gypsum Wallboard.** Paper containing wood fibers are subjected to the action of a beater until the fibers are separated in a pulpy mass. The mass is thinned with water until the proportion of fiber to water is not less than 1½% or more than 5% by weight and dry gypsum mixed in to form a paste having the proportions of 100 lb. of gypsum to 150 lb. of the liquid, after which the paste is rolled into shape on a paper liner to form wallboard. Hot or cold water may be used in the beater. The product is stronger where cold water is used but lacks some of the adhesive properties of the hot water mixture. *J. F. Haggerty, Canadian Patent No.* 267,423.

**Gypsum Plastic Composition.** Fibrous material such as old newspapers are reduced by a special form of beater to a condition wherein the fibers are separated from each other and then incorporated with dry gypsum, while in a water-soaked condition. The resulting gypsum-fiber paste can be shaped into desired form to make gypsum products such as tile, block or wallboard of light weight and strength. *J. F. Haggerty, Canadian Patent No.* 267,422.

**Cement from Slags.** Slag is mixed with gypsum or other compounds containing sulphur and heat applied so that manganous compounds of the slag are converted to manganous sulphites. Sufficient limestone is then added to give the slag the desired composition for cement. *English Patent No.* 267,539.

**Grading of Aggregates With Special Reference to Cement Products Manufacture.** H. Richarz suggests a method of grading easily used in practice and whose purpose it is to follow Fuller's curve.

To eliminate all sieving operations a sand free coarse aggregate should be purchased and used with a good sand (Rhine sand). The analysis of such coarse aggregate is as follows:

| | |
|---|---|
| Size 0 — 1.2 mm. | 1.0% |
| 1.2 — 4 mm. | 2.7% |
| 4 — 9 mm. | 33.8% |
| 4 — 20 mm. | 62.5% |

When platted, this curve closely follows Fuller's curve from 4 mm. on, assuming a straight line course. Sufficient sand should now be added to it to make up for the deficiency of fines. The practical sieve operations require but one sieve with 4 or 5 mm. sieve opening, as the Rhine sand leaves but a slight residue on these sieves. The above sizes then become:

| | |
|---|---|
| $K_1$ (0- 4 mm.) | 3.7% |
| $K_2$ (4-20 mm.) | 96.3% |

The amount of size $K_1$ is so small that it can be neglected. The proportions of the aggregates can now be easily determined. A 1:4 mix would require 20% cement. This would mean 80% aggregate. According to Fuller's curve sizes 0 to 5 mm. should make up 39%, from which 20% should be deducted for cement. This leaves 19%. The mixed aggregate should have the following grading:

| | |
|---|---|
| $K_1$ (0-4 mm.) | 19 parts |
| $K_2$ (4-20 mm.) | 61 parts |
| | 80 parts |

or, computed in per cent:

| | |
|---|---|
| $K_1$ (0- 4 mm.) | 24% |
| $K_2$ (4-20 mm.) | 76% |
| | 100% |

The concrete aggregate thus obtained will have the following true grading:

$$24 + \frac{3.7 \cdot 76}{100} = 26.8\%\ K_1$$

$$\frac{96.3 \cdot 76}{100} = 73.2\%\ K_2$$

These proportions approximately correspond to the computed 24 and 76%. The difference is due to the neglecting of 3.7% of (0-4 mm.) material in the coarse aggregate. These computations are sufficiently accurate for ordinary work, but should be carried out more exactly in the case of thin sections and important work. A general formula derived to cover all cases is as follows:

$$k_1 \cdot x + c_1 \cdot y = f_1 \quad \ldots\ldots (1)$$
$$k_2 \cdot x + c_2 \cdot y = f_2 \quad \ldots\ldots (2)$$

where x is the quantity of coarse aggregate; y—the quantity of sand required; $k_1$—0-4 mm. sizes in coarse aggregate; $k_2$—4-20 mm. sizes in coarse aggregate; $c_1$—0-4 mm. sizes in sand; $c_2$—4-20 mm. sizes in sand; $f_1$—0-4 mm. sizes on Fuller's curve; $f_2$—4-20 mm. sizes on Fuller's curve.—*Tonindustrie-Zeitung* (1927) **53,** 937-29.

**Törnebohm and the Composition of Alite.** In No. 22, p. 477 of *Zement,* Dr. Goslich refers to Törnebohm's researches which led to the determination of the clinker minerals alite, belite, celite and felite as a result of microscopic studies of cement clinkers. According to Dr. Goslich, Törnebohm did not attempt to make a statement concerning the chemical composition of these minerals. This is only partly true, as Törnebohm did not succeed in isolating these clinker minerals and analyzing them in a pure state.

Nevertheless, 30 years ago he was already able to determine their composition approximately. (Ueber die Petrographie des Portlandzementes, Stockholm, 1897.) He devoted particular attention to alite, which he characterized as the predominating constituent, most easily decomposed by water, i.e., the carrier of the hardening properties. He gives the following composition of alite:

| | | | |
|---|---|---|---|
| $SiO_2$ | 19.48% | MgO | 3.00% |
| $Al_2O_3$ | 7.83% | $Na_2O$ | 0.90% |
| CaO | 67.60% | $K_2O$ | 1.19% |

These values are not analytical results and were worked out on the basis of the somewhat arbitrary assumption that the sample contained 10% celite. However, on the whole, they represent the correct composition of alite.

Törnebohm was not the first man who used the microscope in studying cement. It had been used before for this purpose, particularly by Erdmenger (Tonindustrie-Zeitung, 1880. Suppl. 40).

This signified great progress as up to that time (Annales des Mines, May and June, 1887) the cement was treated as homogeneous. Ten years before Törnebohm the microscope was used by Le Chatelier (3) in studying clinkers and the alite was designated as tricalcium silicate.—*Zement* (1927), 641.

## Recent Process Patents

*The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.*

**Coloring Granulated Minerals.** The mineral granules are wetted sufficiently to coat them with an aqueous silicate solution together with an insoluble pigment in a state of fine subdivision. The mass is then roasted with agitation to a reddish heat. *H. C. Fisher, U. S. Patent* 1,631,628.

**Plaster Material Containing Plaster of Paris from Limestone or Waste Lime Sludges.** The object of this invention is to make possible the profitable outlet for surplus quantities of sulphuric acid when the market is slack and also the economic utilization of waste lime sludges.

In the preferred form, limestone is crushed until most of it passes through a ½-in. screen, after which the crushed stone together with the fines is heated in a kiln at not less than 1600 deg. F. for a period of three (3) hours. At the end of this time only part of the $CO_2$ gas has been expelled, so that the burned rock contains a considerable amount of calcium carbonate as well as calcium oxide. The rock while still hot is fed into any suitable open mixer and an amount of 60 deg. Baumé sulphuric acid equal to about one-fifth the weight of the burned rock is added and mixed with the rock. The heat in the rock and the heat generated by the reaction is sufficient to evaporate all of the water in the sulphuric acid and all of the water formed in the reaction in excess of that required to form calcium sulphate hemi-hydrate. The strength of the sulphuric acid may be varied to compensate for variations in the amount of heat contained by the burnt rock, and also may be varied to vary the resulting temperature of the reacting mass. Since plaster of paris is formed most readily at a temperature around 125 deg. C. the strength of the sulphuric acid should be such that this temperature will be obtained.

When the reaction is complete, the dry mass, containing a mixture of about 70% calcium carbonate and calcium oxide and 30% calcium sulphate hemi-hydrate, is fed directly into a tube mill, or other fine grinding mill. The coarse particles of limestone and lime will be thoroughly ground up and mixed intimately with the calcium sulphate hemi-hydrate. After grinding to the proper fineness, the material is suitable for use as a commercial plaster.

This procedure would also apply to hydrated lime, or lime sludges rich in lime or calcium carbonate. In the case of magnesium limestone, such as dolomite or the oxide therefrom, only sufficient sulphuric acid would be used to react with the calcium present, thus leaving the greater part of the magnesium compound present in the plaster as such. In this way the objectionable characteristics of magnesium sulphate in the plaster would be avoided. *Oscar Gerlach, U. S. Patent No.* 1,634,459.

**Lime Sludge Block or Tile.** Lime sludge formed as a by-product is associated with a cellulosic material such as wood fiber and an inorganic water-absorbing material to form a plastic composition which may be shaped or pressed into desired form for use as a building block or slab. The preferred proportions are 85 parts of thickened lime sludge, 5 parts of disintegrated wood and 10 parts of ground coal ashes or ground slag, all parts being taken by weight. If a light product is desired the woody material may be as high as 33%. Proportions of all materials may be varied to suit the qualities desired in the finished product, but the cementitious material should not be less than 10% or more than 40% of the total mixture. The setting time of the mixture is reduced by use of small amounts of accelerator such as calcium acid sulphate or other activating materials. The blocks should be baked at a temperature in excess of 200 deg. C. and under usual conditions the range should lie between 350 and 700 deg. C.

The patentee notes that "the hardening and strengthening of the mass by heating appears to be due chiefly to the formation of calcium and aluminum silicates and to the action of decomposition products of the cellulosic materials, especially carbon dioxide, upon the lime. Blocks or the like baked at elevated temperatures are much superior to those in which drying and setting take place at atmospheric temperature or under low heat. The baked blocks are strong, light in weight, and not objectionably absorbent. Nails may be driven into them without causing splitting or cracking, and they may be readily cut or sawed into the desired size. These characteristics make the product especially suitable for partition blocks, but it has a wide variety of other uses." *C. J. Herrly, U. S. Patent No.* 1,635,212.

**Pulverized Lime-Fiber Mixture for Plaster.** Dry unslaked pulverized lime is thoroughly mixed with a small portion of vegetable fiber and the mixture sacked for plaster use. The preferred proportions are 20 oz. of shredded sisal fiber to a 280-lb. barrel of ground (50-mesh) lime. A more concentrated form, one part fiber to five parts lime, may be used, but with such proportions slaking should be carried out before addition of sand or other ingredients. Any vegetable fibers may be used, but sisal is preferred because of its cheapness and strength. The invention makes it possible to overcome the wire-like stiffness of the sisal fiber during the slaking of its admixed lime so that the fiber is rendered soft and flexible. Sand may be worked in while slaking is going on. *George B. Wood, U. S. Patent No.* 1,635,391.

**Lightweight Gypsum Product.** A cellular gypsum product comprised of hydrated plaster of paris and the voids left by the contraction and drying of added calcium caseinate. *H. E. Brookby (assignor to U. S. Gypsum Co.), U. S. Patent No.* 1,638,001.

**Treatment of Concrete Surfaces.** A layer of colloidal composition containing a reagent material to react on the cement of the concrete is applied to the concrete surface. The composition serves to retard the setting of the cement and provides a suitable coating or layer in contact with the concrete surface. *U. S. Patent No.* 1,637,321.

**Imitation Marble.** A method of making imitation marble which comprises forming a mold with a glass bottom, coating the bottom of the mold in colors, applying a layer of different colors to produce veining on the coating, throwing in a preconcreting mixture with considerable force to spread the veins and the colors and then pouring in a body layer of concrete drying the product in the mold for about 24 hours under heat. The product is removed from the mold and dried in the air for two days, then impregnated with a waterproofing solution and allowed to dry for one day.—*U. S. Patent No.* 1,637,946.

**Cold Glazes for Concrete, Sand-Lime Brick and Other Building Units.** Building materials are painted with a thin glaze-like coating consisting of a mixture of cement, water and a zinc-soap emulsion. *U. S. Patent No.* 1,638,860.

**Porous Cement Product.** An improved light, strong, porous building material comprising portland cement, sand and scoriaceous basalt in substantially equal parts and ground cork in at least two parts to every part of the basalt. The basalt is reduced to a state short of powdered condition and having numerous small cells. The cement, sand and cork form a mix to receive the cellular basalt and bond only with the exterior cells of the basalt, leaving the inner cells unfilled. The cork, being cellular, adds to the cellular structure of the building material.—*U. S. Patent No.* 1,637,935.

**Glaze for Imitation Stone.** Imitation marble, tile, slab or the like, comprising a facing or surface containing cement and casein and constituted by an initial film-like surfacing layer and a thicker layer, to which latter is united a concrete-like backing. *U. S. Patent No.* 1,638,109.

**Artificial Stone.** A self-setting and self-hardening material for the manufacture of artificial stone without cement or other binding mediums, comprising the admixture of the residual ash of a solid combustible substance and slag with a relatively small amount of water. The mass is kneaded, rolled and stamped while in a moist condition until lumps are formed, and then exposed to steam at a pressure substantially greater than atmospheric pressure for the purpose of hardening. *U. S. Patent No.* 1,633,132.

**Treatment of Rock Phosphate.** A mixture of ground rock phosphate and ammonium sulphate is heated in a closed retort at about 300 deg. C. to produce ammonium phosphates and calcium sulphate. *U. S. Patent No.* 1,638,677.

# Carbon Limestone Co. Installs Eight Yard Shovel

THE Carbon Limestone Co. of Youngstown, Ohio, has installed one of the largest sizes of steam shovels ever built in its quarry at Hillsville, Penn. Such a big machine stands out so strongly in quarry equipment that it is proper to give it a name and to start it to work with some little ceremony. So a "christening party" was held, Wednesday, August 24, at which the shovel was named "Spirit of Carbon" and christened with appropriate ceremonies by Miss Ruth Earnshaw, the daughter of F. O. Earnshaw, the manager of the Carbon plant and quarry.

More than 100 persons were present, including the officers and employes of the company, their wives and friends and invited guests. Lunch was served in tents put up for the occasion and a Pathé camera man took pictures for the news films. The shovel had been tried out a day or two before, but after the party was over it began in earnest on its job of stripping 12 to 15 ft. of top soil from a part of the quarry ground that is to be opened.

The big machine is a Marion 300, No. 11, and it is of the full revolving type developed for coal stripping, which has been so much used in the coal fields of Ohio, Indiana and Illinois. The boom is 90 ft. long and the dipper stick is 56 ft. long. The dipper is 6x6x6 ft. inside and hence holds 8 cu. yd., struck measure. As used in stripping the dirt is heaped up by the pushing of the shovel through the ground so that is usually holds about 9 yd. and sometimes even more.

It takes its power from two 125-hp. boilers and three double engines, one each for the swing, the boom and the hoist. Three men operate it, a shovel runner, a crane man and a fireman. As it moves on rails, other men are needed when the shovel has to move up. Nevertheless, it will reduce the cost of stripping to a fraction of what it was with the shovels and cars and locomotives previously used. For with its great reach the shovel can lay bare so wide an area in one cut that the dirt has only to be side cast to get it out of the way, and hence all transportation charges are obviated.

Several swings were timed which ran from 40 to 55 sec. for a complete cycle. It is expected that when the operator, who has only handled the smaller sizes of shovels, gets used to the big machine he will be able to make the cycle in 40 sec. as a regular thing. Cycles have been made in 30 sec., but Mr. Jones, one of the Marion engineers who erected the shovel, said that this was overcrowding it. A 40-sec. cycle would seem to be fast enough, for if the machine took only 8 yd. in a swing it would handle more than 7000 yd. in a 10-hr. day. Put in another way, it would uncover a space 100 ft. wide and 50 ft. long, or 200 ft. wide and 25 ft. long, each day that it worked, in 12 ft. of

*The party of more than 100 began to gather at noon. Lunch was served in tents*

*Enjoying the thrill that comes from watching a big machine at work*

*Plenty of power to pull the big dipper through earth and roots from the 250-hp. boilers*

*Some young people climb on the load for a swing around the hundred foot circle*

overburden such as it now encounters.

The use of such a large shovel is therefore an economy, and J. C. King, sales manager of the Carbon company, said frankly that it was a necessary economy. Competition with both slag and gravel is very keen in the Youngstown district, and the price of fluxing stone (into which a great part of the Carbon company's output goes) has recently lowered. Hence this company finds, as so many producers are finding, that it is necessary to reduce costs in order to insure profits. And there is no better way to reduce costs than to use large units which will keep labor and handling charges at the minimum.

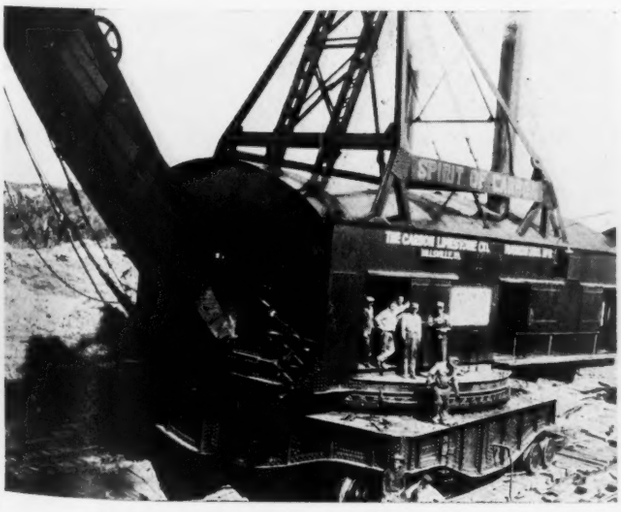
George A. Cheney of the Marion company, who was present, said that he thought the carbon company was pioneering in a way that would be followed by other large producers of stone. The low price and the keen competition of the coal industry brought about the methods of the "strip" mines, which have been successful even in an era of low prices for coal. It is possible that a fall in prices of stone and competitive materials may have the same effect in the rock products industries. In addition there is the present tendency toward large shovels. The No. 300 is not the largest shovel built by the Marion company. It has built several of its 350 type and now, according to Mr. Cheney, it is building a monster with a 15-yd. dipper and a 130-ft. boom. But the "Spirit of Carbon" remains the largest steam shovel in quarry use, for the 350 shovels and larger are electrically driven. Only one company, the Michigan Limestone and Chemical Co., has ever installed even so large a shovel as the No. 300 in a quarry before, although that company has several No. 350 shovels, electrically driven, in its quarry at Rogers City, Mich.

Socially the christening party was a very pleasant occasion. The weather was ideal, the lunch excellent, and everyone was much interested in the work of the big shovel. Several visitors came from as far as Pittsburgh. There was no speechmaking, but Mr. Earnshaw, when the crowd had been gathered for the benefit of the newsreel men, told in a few words of the steadfastness of the Carbon organization, which he said was like the big shovel, "a full 100-ft. circle with everybody pulling to the center." The hearers applauded him and gave him, and the shovel crew, three cheers.

***The size of the shovel may be judged from the men standing beside it. It weighs about 320 tons***

***Pulling the dipper through 15 ft. of quarry overburden***

***Dumping the dipper 100 ft. away from the center***



***The "Spirit of Carbon" with its crew and helpers***

***The dipper shown beside a tall man to give scale***

# Cement and Quarry Sessions at National Safety Congress

THE 16th Annual Safety Congress will be held at the new Stevens Hotel, Chicago, Ill., September 26-30, under the auspices of the National Safety Council.

The cement mill session will be held on Tuesday, September 27, starting at 9:30 a.m. The chairman is R. Frame, insurance manager, Alpha Portland Cement Co., Easton, Penn.; vice-chairman, T. F. Halpin, assistant to the general manager of the Marquette Cement Manufacturing Co., Chicago; secretary, A. J. R. Curtis, assistant to the general manager, Portland Cement Association, Chicago.

The program is as follows:

1. Reports of Officers and Committees. Analysis of Accident Statistics. Report on Contests and Campaigns. Report on Regional Meetings.
2. Address.
   J. B. John, president, Sandusky Cement Co., Cleveland, Ohio; vice-president, Manitowoc, Newago and Petoskey Portland Cement Co's; chairman, committee on accident prevention and insurance, Portland Cement Association.
3. How to Interest Workmen in Their Own Safety.
   W. P. Sabin, assistant to president, Ash Grove Lime and Portland Cement Co., Kansas City, Mo.
   —*Discussion*
4. Election of Officers.

On Tuesday evening, September 26, at 6:30 p.m. will be an informal dinner for the cement-mill men. The toastmaster will be Walter G. King, president of the National Safety Council. The address of the evening was originally scheduled to be made by the late Richard Hardy, chairman of the board, Pennsylvania-Dixie Cement Corp., New York City.

On Tuesday afternoon, at 2:00 p.m., the quarry operating men are invited to sit in on a joint session with the cement-mill men. This session will be in charge of Chairman Frame of the Cement Mill Section, and L. R. Cartwright, chairman of the Quarry Section. Mr. Cartwright is vice-president of the Mid-West Crushed Stone Co., Indianapolis, Ind. The program is as follows:

1. Fixing Accident Responsibility.
   W. L. White, superintendent, Sandusky Cement Co., Cleveland, Ohio.
   W. H. Weitknecht, superintendent, Lehigh Portland Cement Co., Mitchell, Ind.
   —*Discussion*
2. Technical Study of Cement Plant Accidents.
   A. J. R. Curtis, assistant to general manager, Portland Cement Association, Chicago, Ill.

***Quarry Section***

On Wednesday, September 28, at 9:30 there will be the second annual meeting of the Quarry Section of the National Safety Council, with L. R. Cartwright in the chair; D. C. Souder, director of insurance and safety, France Stone Co., Toledo, Ohio, is vice-chairman; A. C. Hewitt, American Lime and Stone Co., Bellefonte, Penn., is secretary. The program is as follows:

1. Opening Address.
   Otho M. Graves, president, National Crushed Stone Association, Easton, Penn.
2. Election of Officers.
3. Quarry Railroad Safety.
   (Speaker to be announced later.)
   —*Discussion*
4. Safe Handling of Rock.
   A. Jones, Indiana Limestone Co., Bedford, Ind.
   —*Discussion*
5. How to Organize a Quarry for Accident Prevention.
   (Speaker to be announced later.)
   —*Discussion*
6. Safe Practices in Stone Mill Operation.
   (Speaker to be announced later.)
   —*Discussion*

On Wednesday noon at 12:30 there will be a joint luncheon session of the mining, quarry and cement mill sections, with A. J. R. Curtis as chairman.

There are numerous papers at other sessions, which cement and quarry operating men can derive profit from attending, particularly the one on Thursday, September 29, at 2:00 p.m. The program covers the subject of "Safety in the Small Plant" as follows:

1. Why Should the Small Plant Be Interested in Safety?
   W. H. Weitknecht, superintendent, Lehigh Portland Cement Co., Mitchell, Ind.
   —*Discussion*
2. Safety Committees—A Necessity or a Nuisance?
   L. M. Challis, employment manager, Copeland Products, Inc., Detroit, Mich.
   —*Discussion*
3. Making Safety Interesting to the Man on the Job.
   H. O. Allison, Beaver Valley Traction Co., New Brighton, Penn.
   —*Discussion*
4. Care of the Injured.
   P. W. Armstrong, assistant manager, Mississippi Valley Structural Steel Co., Melrose Park, Ill.
   —*Discussion*
5. Safety, a Personal Responsibility in the Small Plant.
   John S. Shaw, assistant to general manager, Hercules Powder Co., Wilmington, Del.
   —*Discussion*

There will be a showing of "Safety Movies" on Tuesday evening at 8:00 p.m. The annual banquet of the National Safety Council will be held on Wednesday evening at 6:15 p.m. The toastmaster is Lawrence McDaniel, attorney, St. Louis, Mo. Other speakers and their subjects are:

1. Safety—A Privilege and an Opportunity.
2. Address.
   (Speaker to be announced later.)
3. Safety Sam and the Careful Twins—Handy Andy and Ready Eddy.
   In a broadcast to the 380,000 members of the Careful Children's Club.
4. International Harvester Choral Society (125 Voices).
   Direction of Richard D. De Young.
   Accompanist, Miss Helen Leefelt.

On Thursday evening at 8:30 p.m. will be an "Exhibitors' Smile Party," with vaudeville entertainment and dancing.

## Ohio to Have Safety Congress November 10 and 11

A SAFETY congress of representatives from many Ohio industries is to be held in Columbus, Ohio, November 10 and 11, 1927.

According to the *Cleveland Plain Dealer*, representatives of various industries met in Cleveland, Ohio, recently to form a committee which would plan the coming safety meeting. Rock products interests were represented in this meeting by E. E. Evans of the Whitehouse Stone Co., Toledo.

## Superior Portland Has Birthday Celebration

THE twentieth birthday celebration of the Superior Portland Cement Co. of Seattle and Concrete, Wash., was held near the mill at Concrete, August 13. A ball game and a tug-of-war contest were held between teams from the quarry and the mill. The quarry team received a silver cup for winning the ball game.

According to the Mount Vernon, Wash., *Daily Herald*, Mr. Kane, an upholder of safety first, gave the principal address of the afternoon. He announced that the local plant had run for four consecutive months without a lost time accident. The local employes are doing all possible to prevent accidents, hoping they may be winners of the National Safety First trophy, which is claimed by the corporation operating one year without lost time accident.

Medals were awarded five men for 20 years of service, and to 17 men for 15 years' service. Thirteen received awards for 10 years of service and 55 awards for five years. John C. Eden, president of the Superior company, received a gift from the employes. The evening closed with a dance.

## Massachusetts Sand and Gravel Producers Form Local Association

A RECENT event, which promises to be of great importance to the sand and gravel industry of New England, is the formation of the Massachusetts Sand and Gravel Association, an association similar in character to those formed in other sections of the country. The new association, says the *National Sand and Gravel Bulletin*, already has 19 members, representing the established industry within 40 miles of Boston, where headquarters have been established and a clerical force installed for carrying out the activities of the organization.

The association was formed following the report of a committee selected to recommend to the industry a plan of organization for the sand and gravel producers of Massachusetts. They reported that they found much of interest in the operation of the Lumber Credit and Research Bureau, an association which comprises the lumber dealers of Boston. The final report of the committee, approved by members of the Massachusetts association, provides that member companies shall pay an initiation fee of $10 for one share of stock in the corporation. The minimum dues are $5 monthly, and members who sell more than 50,000 tons per year will pay in addition $5 per year for each 10,000 tons above 50,000 tons.

Committees have been appointed to supervise the collection and compilation of credit information, to devise a code of ethics for the members, to consider various problems with respect to trucking, and to study the question of relationships with other associations. The association will also endeavor to increase its membership in order to gain a full representation of the industry.

It is expected that the entire membership of the association will meet monthly; the committees to meet as the chairmen direct. As the full effect of the association's activities are felt, it is planned to hold more frequent meetings of the membership. One of the chief activities of the association will be the compiling of credit information and the distribution of the data among member companies. A form has been prepared which will be used by the membership in submitting to the headquarters of the association once each month certain information regarding unsatisfactory accounts.

The newly elected officers of the Massachusetts association for the year ended July 1, 1928, are as follows: President, Arthur West, Highland Sand and Gravel Co.; first vice-president, Frank P. Scully, Scully Sand and Gravel Co.; second vice-president, J. H. McNamara, McNamara Sand and Gravel Co.; secretary-treasurer, Charles M. Cornell, Boston Sand and Gravel Co. These officers and the following members constitute the board of directors of the organization: Paul Wagner, Lexington Sand and Gravel Co.; Mrs. George H. Noone, Noone Sand and Gravel Co.; Louis Vassalotti, Riverside Sand and Gravel Co.

The following companies have affiliated with the association:

Boston Sand and Gravel Co., Boston.
Scully Sand and Gravel Co., East Cambridge.
George H. Noone Co., West Roxbury.
Highland Sand and Gravel Co., West Roxbury.
Lexington Sand and Gravel Co., Lexington.
J. H. McNamara, Brighton.
Needham Sand and Gravel Co., Needham.
Edward O'Toole Co., Norwood.
Riverside Sand and Gravel Co., Newton Lower Falls.

Massachusetts Sand and Gravel Co., Boston.
Suburban Sand and Stone Co., Saugus.
Stevens Sand and Gravel Co., Lexington.
Woodland Sand and Gravel Co., Newton.
Woburn Cement Block Co., Woburn.
Powers Brothers, Brockton.
Frank Allen, Walpole.
W. B. Mullen, Boston.
J. Columbo, Dedham.
Connelly Co., Boston.

## All Freight Rates Are Affected by Dallas Hearing

THE coming hearing of the Interstate Commerce Commission, to be held some time soon in Dallas, Texas, may affect all freight rates, and especially those in the rock products industries, according to an editorial in the *National Sand and Gravel Bulletin*, which says:

The Hoch-Smith resolution is beginning to assume larger proportions than had been originally anticipated. When it was introduced in Congress by Senator Smith of South Carolina and Representative Hoch of Kansas, it was designed as a farm relief measure. The essence of the resolution is that it directs the Interstate Commerce Commission to make a sweeping investigation of the entire freight rate structure, with a view to making "revisions" in rates which will permit of softening the burden on agricultural products. Quite aside from the unconstitutional aspects of the resolution (for Congress is not empowered to direct that one industry be preferred over all others in rate making), we cannot see the fairness of penalizing the sand, gravel and crushed stone industries in order to subsidize the agricultural industry by giving it rates which are less than the cost of the service. If, on the other hand, agricultural freight rates are too high, then the commission should reduce them to a fair level and not seek to preserve the revenues of the carriers by transferring the load to another industry which is already overtaxed.

The Southwestern case is but the forerunner of a concerted effort to bring all sand and gravel rates in the country under investigation. It may reasonably be expected that for the next several years the industry will experience litigations and investigations all designed to "standardize" the sand and gravel rate structure. Out of all this the commission hopes to fix a definite basis for the future which will prevent the publication of special rates of any kind, and mileage alone will be the determining factor in the adjustment of market territories.

The administration has declared that "Competent authorities agree that an entire reorganization of the rate structure for freight is necessary, and this should be ordered at once." Our industry and related industries seem to be among the first to be selected for scrutiny, and it is the part of wisdom for every producer to keep closely in touch with the developments and to cooperate with others in his business in avoiding the imposition of an unreasonable rate burden.

Southwestern producers are more directly affected by the coming hearing and are taking measures to secure adequate representation. A meeting of sand and gravel and crushed stone producers of the states of Texas, Arkansas, Oklahoma and of western Louisiana will be held at the Adolphus hotel, Dallas, September 9, to consider ways and means of representation.

## Oregon Company Sued for $20,950 for Removing Gravel

DAMAGE to a camp site on the Rogue river in Oregon, caused by removing gravel, has resulted in a suit for $20,950, according to the *Medford* (Ore.) *News*. Jesse Miller claims he homesteaded the land from which the John Hampshire Construction Co. took gravel without his permission, and that in this way the land has been ruined for a tourist camp, the use to which he intended to put it.

The state highway commission has been sued with the construction company. Miller claims that he erected a store, a service station and other improvements in anticipation of the use of the land as a camp site for tourists, and that these improvements are now of little or no value.

## Natural Sand

THE advantages of natural sand as a fine aggregate are set forth quite fully in a pamphlet published by the Missouri Valley Sand and Gravel Association. It is called "The Advantage of Natural Sand as a Fine Aggregate for Concrete," and the author is E. E. Scholer, who is the managing engineer of the association.

The principal point brought out is that natural sand gives less harshness to concrete, which makes it easier to finish. There are some comparative tests for strength, absorption and other characteristics made with natural sand and "chats," the reject from mills treating zinc ore. This form of fine aggregate is one of the principal competitors of natural sand in the Missouri Valley market.

## City Quarry Lacks Orders and Closes Down

ANOTHER was added to the long list of municipal and county stone quarries that have gone out of business when the city quarry of South Bend, Wash., went out of business.

The *South Bend Journal* says that the reason for closing down was that the quarry could get no orders for its product and that the shut down is permanent.

## Tennessee Phosphate Rock Shows Gains

ACCORDING to the recently issued report of the mineral industries of Tennessee, phosphate rock production in the state was greater by 10,259 tons and $384,021 in value in 1926 than in 1925. The increase was wholly in brown rock production since the production of blue rock decreased nearly 4000 tons. The report says further:

### *Acreage and Costs*

Below is a table giving, in a general way, the amount of phosphate lands which are being operated, in acres, also the number of acres leased, average royalties paid, average yield per acre of phosphate rock, dynamite used in production, average cost per ton at mine, average selling price, etc.:

| | |
|---|---|
| Number acres phosphate land owned in fee | 3,363 |
| Number acres leased | 1,138 |
| Average royalty paid per ton | $0.83 |
| Number acres of rock mined | 1,050 |
| Average yield per acre in phosphate rock (short tons) | 5,500 |
| Dynamite used (number of pounds) | 15,575 |
| Average cost per ton to mine | $1.66 |
| Average cost per ton to wash and dry | $1.49 |
| Amount of product mined by contract (short tons) | 45,170 |
| Average labor cost per ton | $2.95 |
| Average selling price per ton | $5.07 |

It is almost impossible to secure reports from the operators definite enough to compile the above table correctly. Nevertheless, from all of the reports which were received from the operators of the phosphate mines of the state we are inclined to believe that the above figures are practically correct. Where estimates were made by us, they were based on facts given by operators who made a full and complete report of their cost, production, etc., which we are inclined to believe are approximately correct.

### *Operators, Name and Location of Plants*

The following gives the names and addresses of the operators of phosphate plants inspected by the Division of Mines in the year 1926. (The name of the mine is in parentheses.)

American Agricultural Chemical Co. (Loveless), Spring Hill.

Armour Fertilizer Works (McKennon), Columbia.

Charleston, S. C., Mining and Manufacturing Co. (Arrow), Mt. Pleasant.

Charleston, S. C., Mining and Manufacturing Co. (Mayfield), Gordonsburg.

Federal Chemical Co. (Century), Century.

Federal Chemical Co. (Ridley), Ridley.

Hoover & Mason Phosphate Co. (Kittrell), Mt. Pleasant.

International Agricultural Corp. (Blue Grass No. 3), Mt. Pleasant.

International Agricultural Corp. (Wales), Wales.

Rhum Phosphate and Chemical Co. (Rhum), Mt. Pleasant.

Tennessee-Illinois Phosphate Co. (Tennessee-Ill.), Centerville.

The above phosphate producing companies include all of the operations within the state producing phosphate rock for the year 1926. The phosphate operations of the state produce both the blue and the brown rock, the brown rock coming from Giles, Hickman and Maury counties, all of which is mined by stripping or open cut mining. The blue rock is mined exclusively in Lewis county, near Gordonsburg. This rock is mined by underground mining, and the mines are opened up and operated as drift mines. The strata in this section, where it is of sufficient thickness to mine profitably, is generally about tipple height above the railroad, which enables the operator to mine it very economically.

### *Employes and Product*

This table shows the number of employees, the wages paid, and the total amount paid for labor, in phosphate industries in Tennessee in 1926, also the value of the product.

| | Employes | | |
|---|---|---|---|
| County | Total Number Employes | Average Daily Wages | Amount Paid for Labor |
| Giles | 34 | $2.05 | $ 21,614 |
| Hickman | 40 | 2.00 | 32,707 |
| Lewis | 160 | 2.30 | 109,385 |
| Maury | 692 | 2.85 | 607,201 |
| Total | 926 | $2.30 | $770,907 |

| | Product (Long Tons) | | | |
|---|---|---|---|---|
| | Blue Rock | Brown Rock | Total Product | Value of Product |
| Giles | ..... | 16,268 | 16,268 | $84,524 |
| Hickman | ..... | 17,446 | 17,446 | 117,000 |
| Lewis | 44,895 | ..... | 44,895 | 197,316 |
| Maury | ..... | 373,851 | 373,851 | 1,895,014 |
| Total | 44,895 | 407,565 | 452,460 | $2,293,854 |

PRODUCT AND VALUE OF PHOSPHATE IN TENNESSEE AS COMPARED WITH 1925 (LONG TONS)

| | 1926 | | 1925 | |
|---|---|---|---|---|
| County | Product | Value | Product | Value |
| Giles | 16,268 | $84,524 | 17,296 | $92,025 |
| Hickman | 17,446 | 117,000 | 17,525 | 93,882 |
| Lewis | 44,895 | 197,316 | 48,547 | 212,354 |
| Maury | 373,851 | 1,895,014 | 358,833 | 1,511,572 |
| Total | 452,460 | $2,293,854 | 442,201 | $1,909,833 |

## To Improve Cowell Plant

IMPROVEMENTS to the International Portland Cement Co.'s plant at Cowell, 14 miles northwest of Colville, Wash., which will cost $30,000, are to be started immediately, officials of the firm announced recently. The plans include a complete electrification of the plant as well as remodeling of the buildings. A high-power electric wire line will have to be brought three miles to the plant. H. W. Stevens in manager.—*Spokane* (Wash.) *Review.*

## John H. Donahue

JOHN H. Donahue, president of the J. Donahue and Sons Co., Milwaukee, Wis., operating a sand and gravel plant at Waukesha, died suddenly of heart disease at the Emergency hospital, Milwaukee, on the night of August 22. Mr. Donahue was the founder of the company and up to the time of his death was quite active in its affairs.

The funeral was held from his home on August 25. Interment was at Calvary cemtery, Milwaukee.

Mr. Donahue is survived by his five children, Margaret, Madeline, Joseph, Charles and Mary.

## Nicholas W. Duncan

NICHOLAS W. DUNCAN, the chairman of the board of the Marquette Cement Manufacturing Co., Chicago, Ill., died on August 28, 1927, at the Evanston, Ill., hospital following an operation. Mr. Duncan was born in La Salle, Ill., on December 11, 1856, and had made his residence in that city all his life.

After being graduated from Niagara University, New York, in 1878, Mr. Duncan was connected with the Union Coal Co. of La Salle, and from 1884 to 1894 he was general sales manager. In 1902 he took part in the incorporation of the Marquette Cement Manufacturing Co., with his friends, William Dickinson and R. G. Dickinson. He has been actively connected with this company since that time, and for several years has been chairman of its board of directors.

Mr. Duncan was well known for his other activities, besides those which came from his connection with the cement industry, having been, for many years, president of the La Salle bank. His philanthropies were well known, and he was interested in the organization of various associations of business men in La Salle and central Illinois.

The funeral was held at La Salle, Ill., on August 31, 1927. Three sons and one daughter survive Mr. Duncan.

## Gem Stone Silica Company to Build Plant

C. W. SMITH, Oroville mining engineer and metallurgist, is laying plans for the early completion of a plant to make concrete aggregate and tile in Wenatchee, Wash., getting the raw materials from quarries in this section. The plant will be built by the Gem Stone Silica Co.

Plans as drawn up now provide for a warehouse and crushing plant, 60x100 ft., and a tile and cast stone plant, 50x80 ft., in addition to a laboratory and office.

With a capitalization of $150,000, most of which is said to be already subscribed, the Gem Stone Silica Co. will spend $26,000 on the first unit of its plant, according to Mr. Smith, who is president of the company.

## Columbus Gravel Co. Installs New Equipment

THE Columbus Gravel Co., Columbus, Tex., has recently opened another pit east of town, from which road gravel and ballast will be taken.

A large dragline has been purchased in Arkansas and is being shipped for installation at the new pit. The new machine has a 105-ft. boom and is equipped with a 3-yd. bucket.—*Columbus* (Tex.) *Citizen.*

# It Pays to Advertise

CLARENCE (Sandy) Pratt, president of the Pratt Building Material Co., and the Pratt Rock and Gravel Co., used a novel way of announcing the opening of his company's large sand and rock bunkers on Berry Street, by advertising in the newspapers that the first truck belonging to a plasterer, to a brick contractor, to a building material dealer, to a concrete contractor, to a general contractor, etc., arriving at the Pratt company San Francisco bunkers on Monday, August 8, would receive a free load of sand, rock, gravel or concrete mix. A large truck, even a hayrack or moving van was suggested in Sandy's newspaper story. The time of 7:30 A. M. was set for the grand opening and the distribution of free sand and rock. The first truckman arrived at 6 a. m. with new sideboards on his truck and waited until 7:30. When his load of sand was weighed it showed that the "early bird" had "caught" 18,660 lb. or 9.33 tons of free sand. The driver said he read Mr. Pratt's ad in the paper which read: "Bring a big truck." In all, 17 trucks of all makes and all sizes, some with home-made, enlarged bodies lined up for a load of free sand or rock, the line of trucks extending down Berry street for a block, and while the Pratt company advertise that its bunkers are the largest in northern California, the 17 trucks almost cleaned the bunkers and a hurry-up call was sent to the Pratt plants at Sacramento, Marysville, Prattrock (near Folsom), Prattco (Monterey county) and Mayhew (Sacramento county) for more material to arrive by special train if possible. Sandy Pratt, as he is best known, believes in newspaper advertising but did not fully realize its real value until the 17 large trucks walked away with his sand and rock which filled his "mammoth" bunkers. Sandy will continue to advertise his sand and rock that is to be sold, but no more press notices about free material.

### *Early Birds*

The trucks for free material arrived as follows:

*No. 1.* G. Mazzers, a sand, rock and gravel dealer of 4261 Mission street, drove a Pierce-Arrow truck and took 9.33 tons of coarse "Prattco Amber" No. 4 sand, shipped from Prattco (Monterey county). His truck arrived at 6 a. m. He was photographed for the newspapers.

*No. 2.* Jerry Lecartz, driver for L. Devincenzi of 148 Blake street, a grading and hauling contractor, and with a De Martini truck, secured a large load (6.07 tons) of Pratt's concrete mix (Marysville ¼ in. Concrete sand, rock from Prattrock and gravel from the American River) to be delivered to N. Del Treducci, concrete contractor. This truck arrived at 6:06 a. m. or six minutes after truck No. 1.

*No. 3.* Wm. Avidano, driving a G.M.C. truck for the California Terrazzo Marble Co. of 2085 San Bruno avenue, arrived at 6:10 and secured 5.22½ tons of fine "Prattco Amber" No. 4 sand from Prattco (Monterey county).

*No. 4.* Doc Holton of 147 Blake street, concrete contractor, arrived at 6:15 a. m. in a Garford truck and the T. I. Butler Co. Pratt's distributors, gave him 7.04 tons of American River 1-in. washed gravel from Mayhew (Sacramento county).

*No. 5.* W. J. Mahoney, hauling contractor, in a Kleiber truck driven by his son, C. I. Mahoney, secured 4.8 tons of crushed rock from Prattrock (near Folsom). Mr. Mahoney delivered this rock to W. E. Wright, a concrete contractor.


Clarence F. Pratt

*No. 6.* This truck belonged to the Holmes Lime Co., and was driven by Geo. Sothman, who received almost 8 tons of fine "Prattco Amber" No. 4 sand (from Monterey county) in a Mac truck.

*No. 7.* The San Bruno Feed and Fuel Co., sand, rock and gravel dealers at 2565 San Bruno avenue, with Bezleo Briano as driver, in a Kleiber truck secured almost 8 tons of coarse "Prattco Amber" No. 4 sand.

*No. 8.* An Italia truck belonging to L. N. Devencenzi, driven by A. Devencenzi, secured 4.85 tons of washed gravel from Mayhew (Sacramento county) to be delivered to J. Keisireh, a contractor, who has a job at Sixth and Harrison streets.

*No. 9.* Frank Norcia, the well-known plasterer, sent his Pierce-Arrow truck, driven by Bert Harris, who received 4.84 tons of fine "Prattco Amber" No. 4 sand (from Monterey county) for a job in Monterey Heights, near the home of "Mayor" Sandy Pratt.

*No. 10.* Geo. Wolfe, a concrete contractor of 934 Shotwell street, had his driver, A. Anos, in a Sterling truck pick up 6.14 tons of Pratt's Concrete Mix, made of Marysville ¼-in. concrete sand, crushed rock from Prattrock (near Folsom) and washed gravel from Mayhew (Sacramento county).

*No. 11.* Frank McHugh, a street contractor, sent his White truck for a load of American River topping or concrete sand from Mayhew (Sacramento county) and drove away with 7.2 tons.

*No. 12.* S. Warren of 41 De Wolf street, a contractor, sent his driver, Walter Warren, probably a relative, in a Ford truck and secured 2.14 tons of concrete mix similar to truck No. 10—the concrete sand from Mayhew (Sacramento county) and the washed gravel from Mayhew, crushed rock from Prattock (near Folsom).

*No. 13.* A. Biancalini in a Kleiber truck and whose business is hauling and selling sand, rock and gravel, secured 8.65 tons of washed gravel from Mayhew (Sacramento county).

*No. 14.* J. P. Branick, contractor, at 480 Petrero avenue, and driver of his Autocar truck, secured a load of Marysville ⅛-in. plastering sand of 2.69 tons.

*No. 15.* A. Bellotti, driver of a G.M.C. truck, belonging to the California Concrete Co., secured 6.12 tons of American River concrete sand. The sand was delivered to Broderick and Beach street.

*No. 16.* Boni and Co., plasterers, 2352 Lombard street, sent their Pierce-Arrow truck, driven by A. Guidi, for 7.09 tons of "Prattco Amber" mixed sand—50% No. 2 fine sand and 50% of No. 4 coarse sand (from Monterey county).

*No. 17.* J. A. Boquist in a Mac truck, secured 6.21 tons of Marysville ⅛-in. plastering sand for John Johnson, plasterer. The sand was delivered to Franklin and Fell streets.

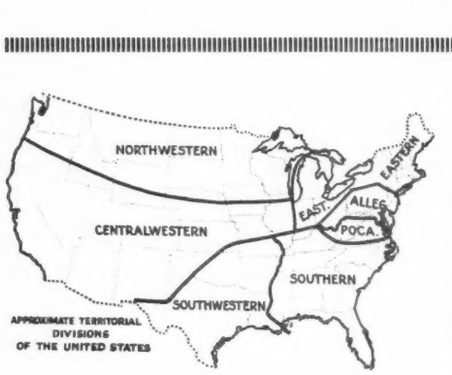
## Reported Will Make Rapid Hardening Cement

IT is reported that the Georgia Portland Cement Corp. will start work in the early fall of this year on its plant near Sandersonville, Ga.

The Augusta, Ga., *Chronicle* says that the plant will be constructed to make quick-hardening portland cement, instead of standard portland, "using a process now employed by only two or three mills in America."

# Traffic and Transportation

EDWIN BROOKER, Consulting Transportation and Traffic Expert
Munsey Building, Washington, D. C.




## Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly car loadings of sand and gravel, crushed stone and limestone flux (by railroad districts), as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

| | Limestone Flux Week ended | | Sand, Gravel and Stone Week ended | |
|---|---|---|---|---|
| District | July 30 | Aug. 6 | July 30 | Aug. 6 |
| Eastern | 3,963 | 3,995 | 17,209 | 17,196 |
| Allegheny | 3,615 | 3,914 | 13,025 | 11,053 |
| Pocahontas | 732 | 743 | 1,312 | 1,278 |
| Southern | 674 | 591 | 14,576 | 13,717 |
| Northwestern | 1,501 | 1,318 | 10,533 | 11,487 |
| Central Western | 603 | 537 | 12,739 | 12,277 |
| Southwestern | 401 | 417 | 6,682 | 6,388 |
| Total | 11,489 | 11,515 | 76,076 | 73,396 |

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1926 AND 1927

| | Limestone Flux 1926 Period to Date | 1927 | Sand, Gravel and Stone 1926 Period to Date | 1927 |
|---|---|---|---|---|
| District | Aug. 7 | Aug. 6 | Aug. 7 | Aug. 6 |
| Eastern | 100,370 | 101,262 | 265,861 | 279,059 |
| Allegheny | 117,215 | 110,177 | 205,443 | 228,651 |
| Pocahontas | 15,190 | 15,055 | 25,715 | 26,394 |
| Southern | 21,107 | 17,493 | 368,344 | 370,266 |
| Northwestern | 42,478 | 42,306 | 176,691 | 199,485 |
| Central Western | 15,065 | 15,756 | 269,391 | 275,491 |
| Southwestern | 8,811 | 9,853 | 157,639 | 168,054 |
| Total | 320,236 | 311,902 | 1,469,084 | 1,547,400 |

***Comparative Total Loadings 1926 and 1927***

| | 1926 | 1927 |
|---|---|---|
| *Limestone flux* | *320,236* | *311,902* |
| *Sand, stone, gravel* | *1,469,084* | *1,547,400* |

## Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning Aug. 28:

### SOUTHERN FREIGHT ASSOCIATION DOCKET

35470. **Sand and gravel**, from Knoxville, Tenn., to Patty, Benton, Ocoee, Oldfort, Conasauga and Tennga, Tenn. Class rates apply at present. It is proposed to establish commodity rates on sand and gravel, straight or mixed carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weight will govern, from Knoxville, Tenn., to Patty, Tenn., 95c; Benton and Ocoee, Tenn., 99c; Oldfort, Conasauga and Tennga, Tenn., 104c per ton of 2000 lb., made on basis of scale submitted to Alabama-Georgia Public Service Commission, less 10%.

35518. Stone from Anna and Krause, Ill., and Cedar Bluff, Corulean and Madisonville, Ky., to Corinth, Miss. Combination rates apply at present. Proposed to establish commodity rates on—**Stone, crushed** or broken, stone screenings or stone refuse (not ground or pulverized stone), minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, in which case actual weight shall apply, carloads, from Anna, Ill., Cedar Bluff, Corulean and Madisonville, Ky., 115c per ton 2000 lb. and from Krause, Ill., 137c per ton 2000 lb., to Corinth, Miss., made 15c per ton higher than in effect to Jackson, Tenn.

35386. **Stone, crushed**, rubble or jetty, carloads, from Columbia, S. C., to Folkston, Ga. Present rate 40½c per 100 lb. It is proposed to establish rate of 176c per net ton on stone, crushed, rubble or jetty, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weight will govern, from Columbia, S. C., Folkston, Ga.

35561. **Sand and gravel**, from Old Dominion Siding and Ellerslee, Va., to Norfolk, Va., and Ft. Monroe, Va. Present rate to Norfolk, 114c per net ton, and to Ft. Monroe, 126c per net ton. Proposed to establish rate to Norfolk from the above points of 90c per net ton and to Ft. Monroe of 110c per net ton on sand, common (other than molding), and gravel, straight or mixed carloads, minimum weight 90% of the marked capacity of car, except when cars are loaded to their visible capacity actual weight will govern. Proposed rate to Norfolk made on basis of Petersburg, Va., combination, and to Ft. Monroe, made on basis of Richmond, Va., combination.

35570. **Agricultural and crushed stone**, from Calera, Ala., to Louisiana points named in Agent Speiden's Tariff 96D, I. C. C. No. 981. Class "E" rates apply at present. It is proposed to restrict the through class rates from Calera, Ala., to Louisiana points named in Agent Speiden's Tariff 96D, I. C. C. No. 981, so as not to apply on agricultural stone (ground limestone), carloads, and crushed stone, carloads, allowing combination to apply.

35616. **Crushed stone** and slag from Rocky Point, Indian Rock and Eagle Mountain, Va., to Norfolk Southern R. R., Columbia Branch stations. It is proposed to establish rate of 205c per net ton on stone, crushed, carloads, minimum weight 100,000 (when 90% of marked capacity of car is less than 100,000 lb., such 90% of marked capacity of car will apply as minimum), except when cars are loaded to their visible capacity actual weight will govern, from Rocky Point, Indian Rock and Eagle Mountain, Va., to points on the Columbia Branch of the Norfolk Southern R. R.; also on slag, carloads, subject to minimum weight specified above on crushed stone, from Longdale and Rousens, Va., to the same destinations. Proposed rate is the same as suggested under Submittal 35206 on crushed stone from Rostoco, Alco, Miles, Pembroke, Rippleemead, Klotz and Longcor, Va., to the destinations in question.

35618. Slag and **crushed stone** from Longdale, Rocky Point, Indian Rock and Eagle Mountain, Va., to Inlet and Ocean Park, Va. Combination now applies. Proposed rate on slag, carloads, minimum weight 100,000 lb. (see note), from Longdale, Va., and on stone, crushed, carloads, minimum weight 100,000 lb. (see note). Note—When 90% of marked capacity of car is less than 100,000 lb., such 90% of marked capacity of **car** will apply as minimum, except when cars are loaded to their visible capacity the actual weight will govern, from Rocky Point, Indian Rock and Eagle Mountain, Va., to Inlet and Ocean Park, Va., 165c per net ton, same as rate recently authorized on these commodities to Lynnhaven, Va.

35646. **Stone**, rubble or **crushed**, from Vick, N. C., to Virginia points. It is proposed to establish the following reduced rates on stone, rubble or crushed, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weights will govern, from Vick, N. C., to Whitehurst, Land, Princess Anne C. H. and Punge, Va., 150c; Pleasant Ridge, Va., 153c; Back Bay and Creeds, Va., 160c per net ton. Proposed rates, except to Pleasant Ridge, are the same as in effect from Greystone, N. C. To Pleasant Ridge, proposed rates are based on the proposed Georgia scale, less 10%.

35656. **Sand and gravel** from Jackson's Lake, Jones and Prattville Jct., and slag from Birmingham, Bessemer and Ensley, Ala., to Tuskegee, Ala. In lieu of present lowest combination rates, it is proposed to establish rates to Tuskegee, Ala., on sand and gravel, in straight or mixed carloads, from Jackson's Lake, Jones and Prattville Jct., Ala., and on slag, carloads, from Birmingham, Bessemer and Ensley, Ala., made on basis of the mileage scale of rates (reduced 10%) submitted by carriers to the Alabama Public Service Commission for application to joint haul traffic over rails of so-called trunk and short line carriers.

35660. **Sand and gravel** from Hattiesburg, Miss., to Riderwood, Ala. Present rate, 350c per net ton. Proposed rate on sand and gravel, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weight will govern, from Hattiesburg, Miss., to Riderwood, Ala., 160c per net ton, arrived at by the observance of the terms of I. C. C. Docket 17517, covering rates on sand and gravel.

35693. **Limestone, ground or pulverized**, marble, stone; ground limestone, etc., carloads, from Chattanooga, Knoxville, Marmor, Sparta, Doyle, Tenn., Cartersville, Ga., Crandall, Ladds, Tate, Whitestone, Ga., and Kinsey, N. C., to eastern port cities, interior eastern, New England and Canadian points. A general revision of existing rates from and to the points mentioned above is proposed, and is suggested in order to establish an origin relationship which will permit shippers to dispose of their product on a competitive basis; also to realign the rates to interior eastern points with those to eastern port cities. The proposed revision is a temporary one and is suggested in an effort to remove existing inconsistencies. A statement of the proposed rates, descriptions and carload minimum weights will be furnished upon request.

35705. **Crushed stone**, from Georgia R. R. producing points to Cleveland, Ohio. Present rate, 570c per net ton. Proposed rate on—Stone, crushed, carloads, minimum weight marged capacity of car, except when cars are loaded to full visible capacity, actual weight will govern—from Conyers, Lithonia, Redan and Stone Mountain, Ga., to Cleveland, Ohio, 442c per net ton. Made by use of the scale prescribed by the Interstate Commerce Commission in Docket 17517, for the distance to Cincinnati, Ohio, plus proportion required by lines beyond.

35732. **Sand and gravel**, from Puddledock, Va., to N. S. R. R. stations. Present rate, 150c per net ton. Proposed rate on sand and gravel, except glass or molding sand, carloads, subject to present description and minimum weight, from Puddledock, Va., to stations on the Norfolk So. R. R., Beaufort Division, Millers, N. C., to Almeta, N. C., inclusive, 147c per net ton, same as now in effect from Petersburg, Va.

### SOUTHWESTERN FREIGHT BUREAU DOCKET

12941. **Sand, gravel and agricultural limestone**, between points in Kansas and Oklahoma. To establish following rates in cents per 100 lb. on sand and gravel, carloads, minimum weight marked capacity of car, except when loaded to full visible capacity of car actual weight, but not less than 50,000 lb., will apply. Proposed rates:

| | Line | | | | Line | | |
|---|---|---|---|---|---|---|---|
| Mi. | Single | Two | Three | Mi. | Single | Two | Three |
| 5 | 3½ | 4½ | 5 | 180 | 8 | 8½ | 8½ |
| 15 | 3½ | 4½ | 5 | 190 | 8 | 8½ | 8½ |
| 20 | 3½ | 4½ | 5 | 200 | 8 | 8½ | 8½ |
| 25 | 3½ | 4½ | 5 | 210 | 8 | 9 | 9½ |
| 30 | 3½ | 4½ | 5 | 220 | 8 | 9 | 9½ |
| 40 | 3½ | 4½ | 5½ | 225 | 8½ | 10 | 10 |
| 50 | 4 | 5 | 5½ | 230 | 8½ | 10 | 10 |
| 60 | 4 | 5 | 6 | 240 | 8½ | 10 | 10 |
| 70 | 5 | 5½ | 6 | 250 | 8½ | 10 | 10 |
| 75 | 5 | 5½ | 6 | 260 | 9 | 10½ | 11½ |
| 80 | 5 | 5½ | 6½ | 275 | 10 | 10½ | 11½ |
| 90 | 5½ | 5½ | 6½ | 280 | 10 | 11½ | 12½ |
| 100 | 5½ | 6½ | 6½ | 300 | 10 | 11½ | 12½ |
| 110 | 5½ | 7 | 7 | 320 | 10½ | 12 | 13 |
| 120 | 6½ | 7 | 7 | 340 | 10½ | 12 | 13 |
| 125 | 6½ | 7 | 7 | 350 | 11½ | 12 | 13 |
| 130 | 6½ | 7 | 7½ | 360 | 11½ | 13 | 14 |
| 140 | 7 | 7 | 7½ | 400 | 11½ | 13 | 14 |
| 150 | 7 | 7 | 7½ | 410 | 12½ | 14 | 15 |
| 160 | 7 | 8 | 8 | 430 | 12½ | 14 | 15 |
| 170 | 7 | 8 | 8 | 450 | 12½ | 14 | 15 |
| 175 | 8 | 8½ | 8½ | 500 | 13½ | 15 | 16 |

Rates on agricultural limestone, carloads, minimum weight 40,000 lb., to be made on the following differentials under the sand and gravel rates: For distances not exceeding 130 miles, ½c; for distances over 130 miles to 250 miles, 1c; for

distances over 250 miles to 400 miles, 1½c; for distances over 400 miles to 500 miles, 2c per 100 lb. It is stated that the proposed rates are now in effect on crushed stone and should therefore be established on sand and gravel, and that rates on agricultural limestone should be made on the same differential basis under crushed stone, sand and gravel as now obtains.

12953. Stone, from Tate and Whitestone, Ga., to San Antonio, Tex. To establish the following rates on **crushed stone**, carloads, to San Antonio:

From Tate, Ga.: $2.50 per net ton (a) plus; $2.30 per net ton (b) plus; $2.40 per net ton (c).

From Whitestone, Ga.: $3.15 per net ton (a) plus; $1.40 per net ton (d) plus; $2.40 per net ton (c).

(a) Minimum weight 90% of marked capacity of car, except that when cars are loaded to their visible capacity actual weight will govern.

(b) Minimum weight 80,000 lb., or if marked capacity of car is less than 80,000 lb. marked capacity will govern.

(c) Minimum weight 50,000 lb., or marked capacity of car if less than 50,000 lb.

(d) Minimum weight 60,000 lb.

It is stated that the proposed rates are necessary in order to allow traffic to move via all gateways.

12960. **Sand and gravel** from Oklahoma to Arkansas. To establish rates on sand and gravel, straight or mixed carloads, minimum weight 80,000 lb., except where marked capacity of car is less the marked capacity will apply, from Muskogee, Byllesby, Ft. Gibson, Keough and Kriener, Okla., to Gentry, Decatur, Gravette and Sulphur Springs, Ark., based on the 9702 scale from Muskogee. It is stated that the proposed basis is now in effect to other points and should therefore be provided for in this instance.

12968. **Crushed** rock or **stone**, and ground limestone, from Humboldt, Kan., to Missouri, Oklahoma, etc. To establish the Chanute, Kan., rates from Humboldt, Kan., to points in Missouri, Oklahoma, etc., named in M.-K.-T. Tariff 3015-I and 5745D applying on crushed rock or stone and ground limestone, carloads, minimum weight 90% of marked capacity of car, except that when actual weight of shipment loaded to full visible capacity is less than 90% of marked capacity of car the actual weight will apply, but in no case less than 40,000 lb. It is stated that the proposed rates should be established in order to allow Humboldt shippers to compete with Chanute shippers.

12830. Stone and gravel, from Stringtown, Okla., to points in Texas. To establish the following distance scale of rates on **crushed stone, sand and gravel**, carloads, minimum weight 90% of marked capacity of car, except where cars are loaded to full space-carrying capacity actual weight should apply, from Stringtown, Okla., to points in Texas:

| Miles | Single Line (See Note) |
|---|---|
| 60 miles and over 50 | 90 |
| 70 miles and over 60 | 95 |
| 80 miles and over 70 | 100 |
| 90 miles and over 80 | 105 |
| 100 miles and over 90 | 110 |
| 110 miles and over 100 | 115 |
| 120 miles and over 110 | 120 |
| 130 miles and over 120 | 125 |
| 140 miles and over 130 | 130 |
| 150 miles and over 140 | 135 |
| 175 miles and over 150 | 145 |
| 200 miles and over 175 | 155 |
| 225 miles and over 200 | 165 |
| 250 miles and over 225 | 175 |
| 275 miles and over 250 | 185 |
| 300 miles and over 275 | 200 |
| 325 miles and over 300 | 210 |
| 350 miles and over 325 | 220 |
| 400 miles and over 350 | 235 |
| 450 miles and over 400 | 250 |
| 500 miles and over 450 | 270 |
| A75 miles and over 70 | 100 |
| 80 miles and over 75 | 100 |

Note—Via two lines, add 15c; via three lines, add 30c; via four lines, add 40c.

Effective June 1, 1927, in Item 2762 of A. C. Fonda's 2J, basis of rates was established on commodity involved. The shippers at Stringtown advise that it will be necessary that they have a readjustment of their rates to points in Texas to enable them to compete with the Texas shippers.

12923. Stone, from Marquette, Mo., to Memphis, Tenn. To establish rate of 113c per net ton on **crushed stone**, carloads, minimum weight as per St. L.-S. F. Tariff 3170, from Marquette, Mo., to Memphis, Tenn. It is stated that the proposed rate is in effect from competing points and should therefore be established from Marquette.

12993. **Molding sand**, from Red Bay, Ala., to Dallas, Texas. To establish a rate of $6.11 per ton of 2000 lb. on molding sand, carloads, minimum weight 80,000 lb., or if marked capacity of car is less than 80,000 lb., marked capacity of car will govern, from Red Bay, Ala., to Dallas, Texas. Shippers desire to ship to their foundry at Dallas, Texas, molding sand produced at Red Bay, Ala., the present rate being prohibitive.

## TRUNK LINE ASSOCIATION DOCKET

16041. Combination rates on **sand**, from points in Trunk Line territory to Albert Lea, Beloit, etc., being lower than through published rates, it is desired to cancel through published group rates and to establish rates as follows, from New York basis:

| To | Thru Rate | To | Thru Rate |
|---|---|---|---|
| Albert Lea, Minn. | 39 | Madison, Wis. | 31 |
| Beloit, Wis. | 31 | Shakopee, Minn. | 39 |
| Janesville, Wis. | 31 | Watertown, Wis. | 31 |
| La Crosse, Wis. | 36½ | | |

Usual differentials to apply from other basing points, Rule 77 to take care of intermediate territory. Rates to Zenda and Lyons, Wis., to be continued on Beloit, Wis., basis, and McFarland and Stoughton, Wis., on Madison basis. No change to be made to the latter points.

16046. (A) Building lime, carloads; (B) **Agricultural lime** (having no value for building or chemical purposes), carloads, minimum weight 30,000 lb., from Pancoast, Penn., to Penna. R. R. points, Sherwood, Penn., to Red Bank, Penn.; Diamond to Sligo, Penn.; Falls Creek to Driftwood, Penn.; L. E. F. & C. R. R., Carrier to Clarion, Penn.; B. R. & P. Ry., main line, excluding branches, Falls Creek to Punxsutawney, Penn., inclusive, Harvey's Run to Bradford, Penn., (A) rates ranging from 8c to 10c per 100 lb.; (B) 7½c to 9c per 100 lb. Reason—Proposed rates are comparable with rates on like commodities or similar distances, condition and services.

16051. To revise the rates on **crushed stone** and common and building **sand**, carloads, from Cumberland, Md., to W. Md. Ry. stations, Nethken, Md.; Davis, W. Va.; Elkins, W. Va.; Harding, W. Va.; Weaver, W. Va., and various rates ranging from 90c to $1.30 per ton of 2000 lb.

16062. **Crushed stone**, N. O. I. B. N. in O. C., carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Feura Bush, N. Y., to New Baltimore, N. Y., Pattersonville, N. Y., 5c, and South Amsterdam, N. Y., 83c per ton of 2000 lb. Reason—Proposed rates are fairly comparable with rates on like commodities from and to points in the same general territory, as per I. C. C. WS-5983.

16067. **Gravel and sand**, other than blast, engine, foundry, molding or silica, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Tioga, Penn., to D. L. & W. R. R. points, Painted Post to Bath, N. Y., inclusive, $1.10 per ton of 2000 lb. Reason—Proposed rate is comparable with existing rates from Alfred, N. Y., to same destination points, as per Erie R. R., I. C. C. No. 17571.

15935. **Sand**, other than blast, engine, foundry, glass, molding and silica, **and gravel**, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Alfred, N. Y., to Freeman, N. Y., $1.25 per ton of 2000 lb. Reason—Proposed rates compare favorably with rates on like commodities from and to points in the same general territory, as per Erie R. R. Tariff I. C. C. Nos. 17953 and 17571.

15951. **Crushed stone**, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Ashcom, Penn., to Johnstown and Altoona, Penn., $1.05 per ton of 2000 lb. Reason—To establish rates which will be comparable with those in force from other crushed stone shipping points, viz.: Bellefonte, Pleasant Gap and Water Street, Penn., as per P. R. R., G. O.-I. C. C. No. 14487.

15984. **Sand**, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Mizpah and Menantico, N. J., to Clayton, N. J., 60c per ton of 2000 lb. (to expire Dec. 31, 1927). Reason—Proposed rates is comparable with rate now in force in the same general territory as per C. N. J. Tariff, I. C. C. No. G2791.

15986. **Sand or gravel** carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Phillipsburg, N. J., to Holland, N. J., 55c per ton of 2000 lb. (subject to Rule 77). Reason—Proposed rate is comparable with rates from and to points in the same general territory.

16085. To publish the following scale of rates for application on **sand** (other than blast, engine, foundry, glass, molding or silica, ground from silica or pebble rock or loam), carloads, and **gravel**, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity, actual weight will apply, from all producing points in the state of West Virginia, except Wheeling, Parkersburg, New Martinsville, Cascade, Greer, Walls Pit and Moundsville, to all destinations therein involving intrastate movement:

PROPOSED (NOTE)
Rates in cents per 2000 lb.

| | |
|---|---|
| 20 miles and under | 60 |
| 40 miles and over 20 miles | 70 |
| 60 miles and over 40 miles | 80 |
| 80 miles and over 60 miles | 90 |
| 100 miles and over 80 miles | 100 |
| 125 miles and over 100 miles | 110 |
| 150 miles and over 125 miles | 120 |
| 175 miles and over 150 miles | 130 |
| 200 miles and over 175 miles | 140 |
| 225 miles and over 200 miles | 150 |
| 250 miles and over 225 miles | 160 |

Note—The scale shown will apply for one-line haul. Joint-haul rates will be 20c per 2000 lb. higher. Rates to points on Scotts Run Branch of Monongahela Railway, Lemley, W. Va., to Brave, Penn., inclusive, will be made 40c per 2000 lb. over Randall, W. Va.

16089. **Crushed stone**, carloads, minimum weight 90% of marked capacity of car, Atlas and Lime Crest, N. J., to Franklin, N. J., 50c per net ton. Reason—Rate comparable with others for like distances.

16094. **Sand**, other than blast, engine, molding, foundry or silica, **and gravel**, carloads, minimum weight 90% of marked capacity of car except when car is loaded to cubical or visible capacity, when actual weight will apply, from Lacona, N. Y., to stations on the N. Y. O. & W. R. R., rates ranging from $1.20 to $2.30 per net ton. Reason—Rates fairly comparable with rates from shipping point in the immediate vicinity.

16096. **Crushed stone**, carloads, minimum weight 90% of marked capacity of car, Lime Crest, N. J., to Ridgefield, N. J., rate $1.40 per net ton. Reason—Rate fairly comparable with others for like distances.

16106. **Sand and gravel** (other than blast, engine, foundry, glass, molding, sea or silica), carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity, actual weight will apply, from Silver Springs, N. Y., to South Dayton, N. Y., rate $1.10 per net ton. Reason—Rate fairly comparable with others for like distances.

## CENTRAL FREIGHT ASSOCIATION DOCKET

16371. To establish on **sand** (other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) **and gravel**, carloads, to New Alexandria, Penn., from Ambridge, Baden, Freedom and Rochester, Penn., rate of 125c per net ton. Present rate, 16c from Ambridge, and 17c from other points.

16372. To establish on **sand** (other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) **and gravel**, carloads, to Punxsutawney, Penn., from Ambridge, Baden, Freedom and Rochester, Penn., rate of 205c per net ton. Present rate, 21½.

16378. To establish on **crushed stone**, carloads, minimum weight 90% of marked capacity of car, except when loaded to cubical or visible capacity, actual weight will apply, Carey and McVittys, Ohio, to Wharton, Ohio, 50c per net ton. Present rate, 60c per net ton.

16380. To establish on **crushed stone**, carloads, minimum weight 90% of marked capacity of car, except where car is loaded to full cubical or visible capacity, actual weight will apply, Milltown and Marengo, Ind., to Olney, Ill., rate of 113c per net ton. Present rate, 370c per net ton.

16401. To establish on **sand and gravel**, carloads, from Brevoorts, Ind., to St. Francisville, Ill., 63c per net ton, and to Flat Rock, Ill., 88c per net ton. Present rate—To St. Francisville, 88c per net ton to Flat Rock, Ill., $2.10 per net ton.

16322. To establish on **sand and gravel**, carloads, Mantua, O., to Wickliffe, O., rate of 80c, and to Willoughby, O., 85c per net ton. Present rate, 90c per net ton.

16323. To establish on **crushed stone**, carloads, East Liberty, O., to Groveport, O., rate of 85c per net ton. Present rate, 13½c.

16340. To establish on **crushed stone**, carloads, Findlay, O., to Vanlue, O., rate of 50c per net ton. Present rate, 60c per net ton.

16358. To establish on **crushed stone** in bulk, in open cars; **gravel and sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), carloads, Kenneth and Lake Ciecott, Ind., to Knox, Ind., rate of 85c per net ton (distance 47 and 50 miles, respectively). Present rate, 101c per net ton.

16361. To establish on **sand and gravel**, carloads, from siding of the Buck Hill Washed Sand and Gravel Co., west of Canton, O., to Lorain, O., rate of 95c, and Plymouth, O., 100c per net ton. Present rates, to Lorain, O., 100c per net ton, and to Plymouth, O., 15c per 100 lb.

## ILLINOIS FREIGHT ASSOCIATION DOCKET

4141. **Sand** (not molding nor silica) **and gravel**, carloads, minimum weight 90% of marked capacity of car, except when loaded to full visible capacity actual weight will apply, but not less than 40,000 lb., from Sheridan, Ill., to Granville and McNabb, Ill. Rates in cents per net ton. Present, Class "E"; proposed, 100.

4142. **Stone, crushed**, carloads, minimum weight marked capacity of car, from Anna, Ill., to M. & E.

R. R. stations, Pittsburg and Paulton, Ill. Rates in cents per ton of 2000 lb. Present, 101; proposed, 88.

1526. **Crushed stone**, carloads, from Anna to Carlyle, Ill. Present rate, combination; proposed, 115c per net ton.

4146. **Sand and gravel**, carloads, from Coleman to Villa Park, Ill. Present rate, combination; proposed, 80c per net ton.

4052. **Sand and gravel**, carloads, minimum weight marked capacity of car. From Metropolis, Ill., to following Illinois points (rates in cents per net ton):

| | Pres. | Prop. | | Pres. | Prop. |
|---|---|---|---|---|---|
| Harrisburg | 101 | 88 | Ledford | 101 | 88 |

4147. **Sand and gravel**, carloads, usual minimum weight. Proposal to establish commodity rate of $1.01 per net ton from Peoria, Ill., to Cornell, Ill., via T. P. & W. Ry., Fairbury, Ill., and Wabash Ry.

4148. (1) **Stone**, viz.: Stone, ground or pulverized (in bulk), **crushed** or rough, quarried in straight or mixed carloads.

(2) **Agricultural screenings** or dust (fertilizer limestone), ground sufficiently fine so as to be suitable for acid soil treatment, carloads, to (representative) Pittsburgh, Ill. (rates in cents per net ton):

| | Present | | Proposed | |
|---|---|---|---|---|
| From | (1) | (2) | (1) | (2) |
| Valmeyer, Ill. | 118(3) | 88 | 93 | 88 |
| Krause, Ill. | 110 | 110 | 93 | 93 |
| Menard, Ill. | Combination | | 93 | 71 |

(3) Applies on state traffic only.

4149. **Sand, gravel**, chert, slag, crushed stone, rubblestone and broken stone, carloads, between St. Louis, Mo., and all points in Illinois on the L. & N. R. R. Proposal to revise existing commodity rates and to establish additional rates between the above mentioned points on basis of the scale shown below which are on the same level with rates prescribed in I. C. C. Docket 17517.

| Distances— | Cents |
|---|---|
| 10 miles and under | 50 |
| 20 miles and over 10 | 55 |
| 30 miles and over 20 | 60 |
| 40 miles and over 30 | 70 |
| 60 miles and over 40 | 80 |
| 80 miles and over 60 | 90 |
| 100 miles and over 80 | 100 |
| 125 miles and over 100 | 110 |
| 150 miles and over 125 | 120 |
| 175 miles and over 150 | 130 |
| 200 miles and over 175 | 135 |

4150. **Crushed stone, sand and gravel**, carloads, minimum weight 90% of marked capacity of car used, from Joliet district points to stations on B. & O. R. R., viz., Casner and La Place, Ill. Present, full combination of locals or through class rates; proposed, $1.13 per net ton.

### WESTERN TRUNK LINE DOCKET

2051. **Crushed stone**, carloads, minimum weight 90% of marked capacity of car, except when loaded to full visible capacity and weight is less than 90% of marked capacity actual weight will apply, but in no case shall the minimum weight be less than 50,000 lb., from Quartzite, Minn., to Lindsay, Neb. Present rate, 30½c per 100 lb. (Class E); proposed, 12c per 100 lb.

2051-A. **Crushed stone**, carloads, minimum weight 90% of marked capacity of car, except when loaded to full visible capacity and weight is less than 90% of marked capacity actual weight to apply, but in no case shall the minimum weight be less than 50,000 lb., from Quartzite, Minn., to Madison, Neb. Present, class rate; proposed, 12c per 100 lb.

2051. **Crushed stone**, carloads, minimum weight 90% of the marked capacity of car, except when loaded to full visible capacity, in which event actual weight will apply, but not less than 50,000 lb., from Quartzite and Casper, Minn., to Granville, Paulina, Southerland, Ia., on the C. & N. W. Also, from Quartzite, Jasper and Pipestone, Minn., to Primghar, Larrabee, Cherokee, Ia., on the I. C. R. R. Present, class rates; proposed, 5½c per 100 lb. to all destinations shown above.

2310D. **Sand, gravel**, sand and gravel pit strippings, carloads, minimum weight 90% of marked capacity of car, except that when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb., from Portage, Wis., to Davenport, Ia. Present rate, $2.40 per net ton; proposed, $1.30 per net ton.

### NEW ENGLAND FREIGHT ASSOCIATION DOCKET

12876. **Beach or shore sand**, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity, actual weight will apply, from Gloucester, Mass., to Beverly, Mass., 50c per net ton; to Boston, Mass., 90c per net ton. (Rates to expire one year from effective date.) Reason—To meet motor truck competition.

## Recent I. C. C. Decisions

**18054.** Rate on core sand from Onset and Wareham, Mass., and from Pontiac and Bellefonte, R. I., to Waterbury, Conn., found unreasonable. Future rates to be presented and reparation awarded.

**19265.** Rate of 33.5 cents on cement from North Birmingham, Ala., to Morgan City, La., found inapplicable in that it exceeds 31 cents. Reparation recommended to that basis.

**17796.** Crushed stone rates from Thornton, Ill., to designated destinations in Northern Indiana and Southwestern Michigan found unreasonable and new rates ordered established by July 2. The Commission found the rates, for the present, and the future will be, unreasonable to the extent they exceed, or may exceed, 120 cents to Kalamazoo, 125 cents to Fort Wayne and Battle Creek, 135 cents to Grand Rapids, 140 cents to Lansing and Muskegon, and 145 cents to Pentwater. It said those rates should be taken as base rates and rates to each intermediate destination should be the same as to the base point next beyond. The Commission found that the rates named would remove any undue prejudice which might exist. It said the carriers, at the hearing, expressed a willingness to continue McCook and Lehigh on a rate parity with Thornton. Therefore, it said that that relationship would not be further considered.

**I. and S. 2851.** In a report written by Commissioner Lewis, sand from Pleasant Lake, Ind., to Gary, Ind., Chicago, and related points (mimeographed) the Interstate Commerce Commission, by Division 1, said the New York Central had not justified an increase from 80 to 96 cents a net ton on sand from Pleasant Lake to the Chicago switching district, but had justified an increase to 90 cents a ton on a single-line haul.

**18949.** Recommended that the Interstate Commerce Commission find unreasonable a rate of 13.5 cents over the route of the Wabash from Kansas City, Mo., to Des Moines, Iowa, on haydite to the extent it exceeded, exceeds or may exceed a rate of 11.5 cents, which is the same as the rate over the short route of the Chicago Great Western, award reparation and prescribe 11.5 cents for the future. In Haydite Co. vs. Santa Fe, 96 I.C.C. 312, the commission prescribed a scale on haydite, but failed to say the rates should be made over the long-line routes. The examiner said the carriers admitted that they should have made 11.5 cents applicable over the long route in question.

**19394.** Rate of $10.73 per ton on fuller's earth from Attapulgus, Ga., Quincy and Jamieson, Fla., to Falling Rock, W. Va., unreasonable to the extent it exceeds $8 per ton. Order that rate for future and award reparation.

**I. and S. No. 2953.** Commission has suspended, from July 29 until February 29, schedules as published in Chicago, Burlington & Quincy I. C. C. No. 16841. The suspended schedules propose to increase the rates on molding sand, carloads, from Dallas City, Ill., to Burlington and Keokuk, Iowa. The following is illustrative:

Molding sand, carloads, rates in cents per ton of 2000 lb., to Burlington, Iowa, present 75, proposed 76; Keokuk, Iowa, present 100, proposed 111.

**19311.** Plaster rates exceeding 33.5 cents from Ludwig, Neb., to Seattle, University and Fremont, Wash., and 36 cents to Ballard and Bellingham, Wash., found unreasonable. Reparation awarded.

**18718.** Glass sand rates from the Hancock district, also called the Berkeley district, including Hancock and Berkeley Springs, W. Va., and Tonoloway and Round Top, Md., to Belle Vernon, Jeannette, Monongahela City and New Kensington, Penn., was, is and for the future will be unjust and unreasonable to the extent it exceeded, exceeds or may exceed $1.95 per net ton. Order the new rate for the future and award reparation.

## Open Top Car Supply

WITH the advent of the fall season, producers of sand, gravel and crushed stone may expect a general tightening up in the supply of open-top railroad equipment, says a bulletin issued by the Mid-West Shippers' Advisory Board. The bulletin offers some suggestions for the maintenance of adequate car supply in that industry as follows:

1. Making use of open-top, flat-bottom equipment to the fullest extent possible where that type of car fully answers the purpose; and consignees are requested to specify on their orders placed with shippers.

2. Complete loading of all cars placed daily, and delivery of shipping instructions to railroad agent for forwarding same day.

3. Prompt unloading of cars at destination.

4. Complete unloading of the lading so that the car will be conditioned for a new load without the necessity for sending cars to cleaning yards, creating unnecessary expense and loss of car-days.

5. Where self-unloading cars are in service, the bottom or side dumps should be restored to their closed position at once so that cars will be available for immediate return to loading stations.

## Sand, Gravel and Stone Men Meet in Dallas September 9

THE producers of sand, gravel and crushed stone of the states of Louisiana, Texas, Arkansas and Oklahoma have been asked by the National Sand and Gravel Association and the National Crushed Stone Association to meet at the Adolphus hotel in Dallas, Texas, on September 9.

The meeting is to consider ways and means by which the producers will be represented at the coming hearing of the Interstate Commerce Commission which is to be held in Dallas some time in the next two months.

# Cement Products



# Properties and Testing of Cement Colors*

## The Desirable Characteristics of Cement Colors and How These May Be Determined by Analysis

By Dr. C. R. Platzmann
Berlin-Wilmersdorf

THE tremendous growth of the cement products industry within the last decades and the variety of cement products now manufactured has resulted not only in careful consideration of the shape and size of products, but also in the selection of materials, with regard to their properties as determined by tests. The cement problem appears to be settled and the cement users are protected by specifications in practically all countries, and the requirements for sand and gravel can be easily fulfilled with some care. The selection of cement colors, however, is still carried on in accordance with personal experience, an inexplicable absence of prejudice being frequently encountered, particularly in the smaller industries. Only in recent years has the problem been taken up by the American Portland Cement Association, which was first to introduce this question as a subject of discussion.

### *Colored Roofing Tile*

Considerable protest raised against the introduction of the cement roofing tile in architectural circles and by the home conservation movement was directed not against cement or aggregate, but mainly against the color, which had frequently proven imperfect and not "true," i.e. did not reproduce the color of the fired product.

Colors may be of widely varying nature, depending upon the kind of cement products. Although cement roofing tile is generally red, different color possibilities exist for decoration of building fronts. The following discusses what colors in general and in particular are suitable for cement products and also treats on the properties of these colors and the manner of testing.

It should be noted from the start that all colors of organic nature should be excluded, as they are not resistant enough to the action of lime or weathering. Only mineral colors can be used in this connection and these may either be pure earthy colors, produced by the preparation of a natural mineral, or, second, mineral colors made resistant by special chemical processing or the residue in different chemical industries. They may be also produced synthetically. The ochres and umbers belong to the first class; certain red oxides belong to the second class, and ultramarine colors represent the third.

The value of colors is determined by a great many different factors which have their origin in the above classification. The following are important points: chemical composition and physical properties of the materials, method and quality of preparation, strength and fineness of particles, method of manufacture and its effect on the product, nature of possible admixtures. All of these points should be considered. The method of preparation varies with the chemical and physical properties of the raw materials. Whereas ochres may usually be freed from impurities by washing, certain red oxides require a firing process if a bright red color is desired. Some materials are naturally soft, while others may be brought to required fineness only in crushing plants equipped with modern crushers. If the method of preparation involves separation of a part of the material, the composition of the residue retained in the color is of great importance, as it may contain substances harmful to cement. Certain manufacturers are in the habit of "beautifying" their product by adding, for example, gypsum to certain iron oxides in relatively large quantities. A number of English reds, produced as by-products of the sulphuric acid and alum industries, have a not inconsiderable content of sulphuric anhydride. These examples suffice to illustrate the numerous causes influencing the final product.

The following table of colors to be used makes no pretension at being complete:

| SHADE | COLOR |
|---|---|
| Red | Iron oxides |
| Yellow | Ochre, zinc yellow |
| Brown | Umber |
| Blue | Ultramarine, cobalt |
| Green | Ultramarine, chromium oxide |
| Black | Coal black, manganese black |

Iron oxide reds commercially used for the coloring of cement products vary greatly in composition. Their iron oxide content ranges widely, some having as low as 40% and others being 100% oxide. This results in a variation of prices of these colors. As ochres and umbers require a minimum of preparation and grinding, because of their natural softness, their price is comparatively low. Zinc yellow is rarely used for cement products on account of its very high price. In using ultramarine colors, special care is required in the manufacture of cement products to prevent undesirable eruptions. Chrome oxide green, though commanding a high price, is an excellent cement color, resistant to chemical agencies, offering a good yield and satisfactory durability. The "lime green" of commerce, a low priced color, is entirely unsuitable for cement products, as it consists of a magnesium alumino-silicate (augite) which does not yield clear colors. It is also impermanent, as its coloring power depends on its iron compounds, which are attacked by the oxygen and moisture of the air to form brown iron salts. Manganese black is made from brownstone, while coal black is made from pulverized coal.

### *Desirable Properties for Cement Colors*

The properties to be specified for all cement colors should first of all include sufficient fineness. While every cement products manufacturer uses aggregates of definite size, the fineness of the coloring is never tested, a contradiction seldom found in industrial practice of today. It is also to be

*Translated by Margaret Arronet Corbin, Chicago Heights, Ill.

kept in mind that increasing fineness of coloring matter results in greater yield. It should, therefore, be required that its fineness be at least equal to that of the cement or be greater than the latter. Aside from this, it should be pointed out that insufficient grinding of coal black results in unsoundness. The chemical composition should be regulated by further requirements. The colors should be tested for acids and soluble salts as is done with aggregate and mixing water. Care should be taken that the colors used do not contain unnecessary admixtures, added to increase the yield, such as gypsum or spar. It is always of questionable value to use red oxides with a low $Fe_2O_3$ content. The higher the iron oxide content the leaner may be the color mixture, so that the richer color will eventually pay for itself. This is true for other colors such as chrome oxide green, manganese black, etc. Special, light shades are best obtained by using lean mixtures of good colors, rather than resorting to poorer colors. Ultramarines unfortunately frequently contain valueless adulterants; the pure, though costly, color is to be preferred in every case. All colors, with the exception of ultramarines, reduce the strength of cement, this being especially true of ochres and umbers. This is another reason why a lean mixture of a color with high color value is to be preferred. Ultramarines increase the strength of cement, as they contain considerable quantities of soluble silica, which reacts with the lime of the cement forming silicates.

### Color Testing

The following should be distinguished in testing cement colors:

1. Physical-mechanical tests.
2. Qualitative chemical analysis.
3. Quantitative chemical analysis.

1. *Physical-mechanical Tests.* A number of factors, aside from the chemical composition of a color, influence its suitability. Their determination does not require laboratory equipment nor fundamental chemical knowledge. Mechanical and physical properties, such as fineness, soundness, tendency to discoloration, resistance to the alkaline action of cement, true color, color value and resistance to weathering, are of utmost importance in the selection of colors.

The finer the coloring material the greater its yield, i.e., the more surface it will cover. The mixing proportions of cement and color may be changed for increasing fineness of color. The German specifications for fineness of cement require 5% retained on the 900-mesh sieve. To insure good yield and thorough mixing of the color and cement, the color should be required to have the same fineness specifications as cement. The same sets of sieves, as used for aggregates, may be used for sieve analyses of colors. A 100 gm. sample is allowed to pass through a 120-, 900- and 4900-mesh sieve (about 40-, 75- and 180-mesh respectively). The residues on each sieve are weighed and represent the corresponding percentages. If the fineness of the coloring material is nearly equal to that of cement, grinding in the usual color mills and drums is relatively easy, good appearance is insured and impermeability is greatly improved.

The color should have no harmful effect on the soundness of cement, as is the case with colors "beautified" by gypsum, which contain high percentages of $SO_3$. One should proceed as follows: a 100 gm. sample of cement is mixed with 20 gm. color and 24-32% mixing water to a thick, stiff paste, from which standard pats are made. These are used in the regular boiling and heating tests after 24 hours.

A process suggested by E. Cramer serves to determine the tendency to eruptions and discolorations. A paste is prepared from the color sample and distilled water. Upon evaporation of the water the paste is examined for discolorations at the edges. If these are observed, the color is pronounced as having a tendency to eruptions.

The resistance to lime—i.e., to the alkaline action of the cement—is already established by the soundness test. Another method consists in mixing the color to a paste, using lime in one of the mixtures. Discoloration indicates whether a sample is resistant to lime or not.

Testing the fading of a color requires considerable time, unless it is accelerated by the use of ultra-violet rays. By using a little rubber cement the color is applied to a strip of paper. Half of the paper is then covered with dark paper, while the other one is exposed to light. A photographic printing frame is best used for these tests.

To establish the intensity of color, aside from its fineness, the author has used the following simple procedure in a number of cases and with good results. A color, whose physical properties have been established by analyses, is mixed with zinc white in the proportions such as 1:0, 1:1, 1:2, 1:5, 1:10, 1:20, 1:50 and is applied to a sheet of white paper with some rubber cement. The different mixtures are compared with the pure color.

Testing resistance to weathering and durability of a color requires a great deal of time and is difficult. Different factors are involved from the start, which may not always be controlled. The cause of failure may be accurately established only upon making chemical analyses.

### Qualitative Analysis

The methods indicated above were rather simple and represented hints for practical rather than scientific procedure. A thorough knowledge of chemistry is necessary, however, to determine harmful constituents and chemical reactions which are taking place. A small laboratory is, therefore, an absolute necessity in this case. The following requirements should apply to cement colors:

1. They should be of mineral origin.
2. They should contain no appreciable amounts of $SO_3$ and Cl-ions.
3. They should be insoluble in water.

As colors of organic origin cannot resist the action of lime, they are entirely eliminated in this discussion and cannot be used for cement products. To test, whether a color is of organic or mineral origin, a sample is heated on a platinum foil over the flame of a Bunsen burner. Mineral colors are not volatile. Certain changes of color, such as occur in ultramarines, may take place without affecting the question of organic or mineral nature.

Tests for sulfates and chlorides, which, when present, cause discoloration and unsoundness, are made, depending upon the form in which the latter are present. Relatively insoluble salts, such as gypsum, require hydrochloric acid. The soluble sulfates and chlorides, on the other hand, are generally combined with alkalis. $SO_3$ is tested with barium chloride and Cl with silver nitrate. If precipitation occurs, beyond a slight cloudiness with either of these two reagents, a quantitative analysis should be made. The maximum content of $SO_3$ and Cl is limited to 2.5%. Colors which exceed this limit should be rejected. Alkalis are determined by means of a spectroscope; the Beckmann spectral apparatus is good for this purpose.

Color insolubility is determined by washings with distilled water followed by heating up to the boiling point and filtration. If the filtrate is colorless and leaves no residue when evaporated the color is good.

### Quantitative Analysis

A complete quantitative analysis, though

EFFECTS PRODUCED BY TREATING MINERAL COLORS WITH VARIOUS REAGENTS

| Mineral color | Reagent | | | |
|---|---|---|---|---|
| | Hydrochloric acid | Sodium hydroxide | Ammonium sulfate | Ignition |
| Iron oxide | slowly soluble..... yellow | yellow solution..... | upon prolonged..... action black | dark brown $Fe_3O_4$ |
| Ochre, umber | yellow soluble..... white residue | yellow solution..... | dark to black..... | brown red |
| Zinc yellow ($ZnCrO_4$) | orange in boiling.... | soluble ..... | ..... | Chromperle |
| Coal black | unchanged..... | turning brownish.... | unchanged ..... | burns |
| Ultramarine green | Color destroyed..... formation of $H_2S$ | unchanged ..... | unchanged ..... | becomes blue |
| Chromium oxide green | slowly soluble..... green | unchanged ..... | dirty green ..... | unchanged |
| Green earth | rapidly soluble..... evolution of heat greenish yellow | unchanged ..... | unchanged ..... | brownish red |
| Ultramarine blue | discoloration ..... formation of $H_2S$ | unchanged ..... | unchanged ..... | unchanged |

taking some time and requiring laboratory equipment, has the advantage of giving reliable data concerning the nature of the color. It is somewhat essential, for while artificial colors generally maintain a uniform chemical composition natural products and their derivatives vary greatly according to origin, preparation, etc., aside from possible admixtures of gypsum, chalk, spar, brick dust, slate dust, etc. The usual methods should be used for the determination of: silica, alumina, iron oxide, lime, magnesia, sulfuric anhydride, sulfide and loss on ignition.

Special determinations may be necessary in addition to these. Red oxides owe their color value to iron oxide so it is necessary in their case to make a separate determination of alumina and iron oxide. Either gravimetric or volumetric determination of $Fe_2O_3$ may be resorted to. Alumina is determined in the usual manner. The determination of manganese oxide in manganese colors is absolutely necessary and is carried out quantitatively by sodium acetate and bromine water. In investigating ultramarines special care should be taken that no appreciable quantities of gypsum are present. The The $Cr_2O_3$ content is determined in chromium colors. The solution containing chromium as alkali chromate is made to react with mercuro-nitrate and the chromium is precipitated as $4HgO{\cdot}3Cr_2O_3$. Upon heating this precipitate it is first transformed into $Hg_2CrO_4$ and later into $Cr_2O_3$.

The table on the preceding page is for the purpose of rapid identification of the color under test.

The foregoing review of the different methods used by the author for years with the best of success illustrates the variety of points which claim consideration when the exact character of a color is to be determined. Should these or similar tests be made the basis of standards, the frequent failures now encountered would diminish in number as rapidly, as did the failures due to cement, upon adoption of standards.

## Houses of Concrete Lumber

EXPERIMENTS with concrete "lumber" have been going on for years and now seem to be meeting with some success. An English system known as the Winget method seems to have been developed to a practical method and now a system has been introduced in New York which promises well. The following description is by Allen Beals of the Dow Service Reports:

"Engineers went to Manhasset, L. I., last week to see workmen take precast concrete slabs of board size and housewall high, place them on end and bind them in place by steel bonds woven through projecting ribs on the inner side, forming not only a fireproof house, but one having all the sanitary advantages offered by masonry construction. Not only were the walls laid up in that manner, but the floors and partitions as well were thus assembled, at a cost figured at about 44 cents a cubic foot.

It was demonstrated that only forty-one of these full-size building units were required for the walls of the house, 26x26 feet. Furthermore, these units were set in place and bonded by three unskilled and untrained laborers within three days.

"The average house, for example, requires in its construction about 75,000 separate units, but the engineers who visited the scene of the demonstration last week were impressed with the claim that under this new system of building at least 30,000 of these units can be dispensed with, thus making it possible to erect a building with 8-in. wall at 28 cents a cubic foot, or stuccoed on the outside at 44 cents a cubic foot. The panels and shorter lengths also have a place in the construction of the airways, both interior and exterior. Thus a completely fireproof house can be artistically built at approximately the cost of frame.

"The research work of Professors Beyhr and Kreyfield and Joseph Winston, C. E., was most exhaustively carried out, and during these experiments some very interesting and important discoveries were made of hitherto unknown possibilities of reinforced concrete. For instance, they succeeded in producing a reinforced concrete T-shape which bent and reacted in all respects like steel. It is this T-shaped reinforced concrete unit that they are making use of in the Manhasset demonstration."

The method is a modification for American needs of the system known as "Tee-Stone" in England. It was brought to this country by Herbert S. Stoneman and Joseph Winston. It is possible that this method of building may develop to where it is a rival of concrete block and tile as well as frame.

## New York City Increases Insurance Ratings of Concrete Party Walls

NEW ratings for concrete and cement block buildings were issued by the New York Fire Insurance Exchange recently. These ratings, which are given below, are slightly higher than for buildings with brick party wall construction, except in the case of "stores-and-dwellings," where the new rate is 20 to 25% lower:

"Dwellings—Any part of the independent or party wall of which is of hollow or solid cement block, or hollow or solid concrete block: Building, 0.13; household furniture, 0.18.

"Garages, Private Family—Any part of the independent or party boundary walls of which is constructed of hollow or solid cement blocks, or of hollow or solid concrete blocks: Building, 0.25; contents, 0.28.

"Apartment Houses—Any part of the independent or party walls of which is of hollow or solid cement block, or hollow or solid concrete block: Building, 0.18; household furniture, 0.222.

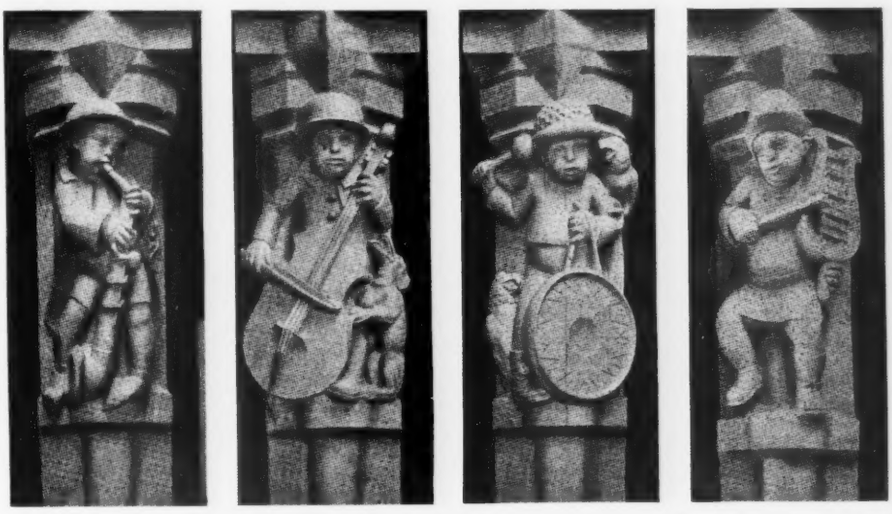
"Stores-and-Dwellings—Any part of the independent or party walls of which is of hollow or solid cement block, or hollow or solid concrete block: Building, 0.30-0.40; household furniture, 0.32-0.40.

"Contents (other than household furniture) of stores-and-dwellings constructed in whole or in part of hollow or solid concrete block, or hollow or solid cement block, must be advanced 12½%, not exceeding 0.125, over the general minimum rates."—New York City *Journal of Commerce*.

## German Concrete Ornaments

THE illustration below is from the German periodical *Zement* and shows the ornaments placed on a large building recently erected in Munich, Germany.

They are reproduced here because they appear to be unusually good examples of what concrete ornamentation should be. The charm of the little figures has been lost somewhat in reproducing the cut from another half-tone, but enough is left to show that the designer had concrete in mind when he made the models, and not cut stone or some other material.



***A recent example of German concrete building ornamentation***

# The Rock Products Market

## Wholesale Prices of Crushed Stone

**Prices given are per ton, F.O.B., at producing point or nearest shipping point**

### Crushed Limestone

| City or shipping point | Screenings, ¼ inch down | ½ inch and less | ¾ inch and less | 1½ inch and less | 2½ inch and less | 3 inch and larger |
|---|---|---|---|---|---|---|
| **EASTERN:** | | | | | | |
| Buffalo, N. Y. | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 |
| Chaumont, N. Y. | .50 | 1.75 | 1.75 | 1.50 | 1.50 | 1.50 |
| Chazy, N. Y. | .75 | ..... | 1.60 | 1.30 | 1.30 | 1.30 |
| Coldwater, N. Y.—Dolomite | | | 1.50 all sizes | | | |
| Danbury, Conn. | 2.25 | 2.25 | 2.00 | 1.75 | 1.50 | ..... |
| Dundas, Ont. | 3.04 | 1.05 | 1.05 | .90 | .90 | .90 |
| Frederick, Md. | .75 | 1.35 | 1.25 | 1.15 | 1.05 | 1.05 |
| Munns, N. Y. | 1.00 | 1.40 | 1.40 | 1.25 | 1.15 | 1.00 |
| Northern New Jersey | 1.60 | 1.50@1.80 | 1.30@2.00 | 1.40@1.60 | 1.40@1.60 | ..... |
| Prospect, N. Y. | 1.00 | 1.50 | 1.40 | 1.30 | 1.30 | ..... |
| Rochester, N. Y. | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 |
| Walford, Penn. | ..... | ..... | 1.35h | 1.35h | 1.35h | 1.35h |
| Watertown, N. Y. | 1.00 | ..... | 1.75 | 1.50 | 1.50 | 1.50 |
| Western New York | .85 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| **CENTRAL:** | | | | | | |
| Afton, Mich. | ..... | ..... | .50 | .75 | ..... | 1.50 |
| Alton, Ill. | 1.85 | ..... | 1.85 | ..... | ..... | ..... |
| Buffalo and Linwood, Iowa | 1.10 | ..... | 1.45 | 1.25 | 1.30 | 1.30 |
| Chasco, Ill. | 1.00@1.30 | ..... | 1.00@1.15 | ..... | 1.00@1.15 | ..... |
| Columbia, Krause, Valmeyer, Ill. | 1.10@1.50 | 1.10@1.25 | 1.20@1.35 | 1.10@1.35 | 1.10@1.35 | ‖1.25 |
| Flux (Valmeyer) | 1.10@1.50 | ..... | ..... | 1.75 | ..... | 1.75 |
| Greencastle, Ind. | 1.25 | 1.25 | 1.15 | 1.05 | .95 | .95 |
| Lannon, Wis. | .80 | 1.00 | 1.00 | .90 | .90 | .90 |
| McCook, Ill. | 1.00 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| River Rouge, Mich. | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 |
| Milltown, Ind. | ..... | .90@1.00 | 1.00@1.10 | .90@1.00 | .85@ .90 | .85@ .90 |
| Mt. Vernon, Ill. | 1.10@1.20 | 1.00 | 1.00 | 1.00 | 1.00 | ..... |
| Sheboygan, Wis. | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| Stone City, Iowa | ..... | ..... | 1.20 | 1.10 | 1.00 | ..... |
| St. Vincent de Paul, Que. | .75 | 1.35 | 1.15 | .85 | .80 | .90 |
| Toledo, Ohio | 1.60 | 1.70 | 1.70 | 1.60 | 1.60 | 1.60 |
| Toronto, Ont. | 1.55 | 2.05 | 2.05 | 1.90 | 1.90 | 1.90 |
| Waukesha, Wis. | .90 | .90 | .90 | .90 | .90 | ..... |
| Wisconsin Points | .50 | ..... | 1.00 | .90 | .90 | ..... |
| Youngstown, Ohio | .70j | 1.25l@1.35h | 1.25l@1.35h | 1.25l@1.35h | 1.25l@1.35h | 1.25l@1.35h |
| **SOUTHERN:** | | | | | | |
| Alderson, W. Va. | .50 | 1.40 | 1.35 | 1.25 | 1.20 | 1.15 |
| Atlas, Ky. | .50 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Brooksville, Fla. | .75 | ..... | 2.65 | 2.65 | 2.40 | 2.00 |
| Cartersville, Ga. | ..... | 1.50 | 1.50 | 1.35 | 1.05 | ..... |
| El Paso, Tex. | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | ..... |
| Ft. Springs, W. Va. | .50 | 1.35 | 1.35 | 1.20 | 1.20 | ..... |
| Graystone, Ala. | | | Crusher run, screened, $1 per ton | | | |
| Kendrick and Santos, Fla. | | | 3½ in. and less, $1 per ton | | | |
| Ladds, Ga. | ..... | 1.65 | 1.65 | 1.35 | 1.15 | 1.15 |
| New Braunfels, Tex. | .60 | 1.25 | 1.10 | .90 | .90 | .90 |
| Rocky Point, Va. | .50@ .75 | 1.40@1.60 | 1.30@1.40 | 1.15@1.25 | 1.10@1.20 | 1.00@1.05 |
| **WESTERN:** | | | | | | |
| Atchison, Kan. | .50 | 1.90 | 1.90 | 1.90 | 1.90 | 1.80 |
| Blue Springs & Wymore, Neb. | .25 | 1.45 | 1.45 | 1.35e | 1.25d | 1.20 |
| Cape Girardeau, Mo. | ..... | 1.25 | 1.25 | 1.25 | 1.00 | ..... |
| Rock Hill, St. Louis Co., Mo. | 1.35 | 1.35 | 1.35 | 1.25 | 1.25 | 1.50 |
| Sugar Creek, Mo. | 1.15* | 1.60† | 1.60‡ | 1.60§ | 1.00¶ | ..... |

### Crushed Trap Rock

| City or shipping point | Screenings, ¼ inch down | ½ inch and less | ¾ inch and less | 1½ inch and less | 2½ inch and less | 3 inch and larger |
|---|---|---|---|---|---|---|
| Branford, Conn. | .80 | 1.70 | 1.45 | 1.20 | 1.05 | ..... |
| Duluth, Minn. | .90 | 2.25 | 1.75 | 1.55 | 1.35 | 1.25 |
| Dwight, Calif. | 1.00 | 1.00 | 1.00 | .90 | .90 | ..... |
| Eastern Maryland | 1.00 | 1.60 | 1.60 | 1.50 | 1.35 | 1.35 |
| Eastern Massachusetts | .85 | 1.75 | 1.75 | 1.25 | 1.25 | 1.25 |
| Eastern New York | .75 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Eastern Pennsylvania | 1.10 | 1.70 | 1.60 | 1.50 | 1.35 | 1.35 |
| Knippa, Tex. | 2.50 | 2.25 | 1.55 | 1.25 | 1.10 | ..... |
| New Britain, Plainville, Rocky Hill, Wallingford, Meriden, Mt. Carmel, Conn. | .80 | 1.70 | 1.45 | 1.20 | 1.05 | 1.05 |
| Northern New Jersey | 1.40 | 2.00 | 1.80 | 1.40 | 1.40 | ..... |
| Oakland and El Cerito, Calif. | 1.00 | 1.00 | 1.00 | .90 | .90 | ..... |
| Richmond, Calif. | .75 | ..... | 1.00 | 1.00 | 1.00 | ..... |
| San Diego, Calif. | .50@ .75 | 1.25@1.50 | 1.25@1.50 | 1.10@1.25 | 1.10@1.25 | ..... |
| Springfield, N. J. | 1.70 | 2.20 | 2.10 | 1.70 | 1.60 | 1.60 |
| Toronto, Ont. | ..... | 3.58@4.05 | 3.05@3.80 | ..... | ..... | ..... |
| Westfield, Mass. | .60 | 1.50 | 1.35 | 1.20 | 1.10 | ..... |

### Miscellaneous Crushed Stone

| City or shipping point | Screenings, ¼ inch down | ½ inch and less | ¾ inch and less | 1½ inch and less | 2½ inch and less | 3 inch and larger |
|---|---|---|---|---|---|---|
| Berlin, Utley, Montello and Red Granite, Wis.—Granite | 1.80 | 1.70 | 1.50 | 1.40 | 1.40 | ..... |
| Columbia, S. C. | ..... | ..... | 1.90 | 1.90 | 1.75 | ..... |
| Eastern Penn.—Sandstone | 1.35 | 1.70 | 1.65 | 1.40 | 1.40 | 1.40 |
| Eastern Penn.—Quartzite | 1.20 | 1.35 | 1.25 | 1.20 | 1.20 | 1.20 |
| Emathla, Fla. | | | Crushed flint rock, 2.50 per cu. yd. | | | |
| Graystone, Ala.—Granite | .50 | ..... | ..... | ..... | ..... | ..... |
| Lithonia, Ga. | .75a | 1.75b | 1.60 | 1.40 | 1.35 | ..... |
| Lohrville, Wis.—Granite | 1.65 | 1.70 | 1.65 | 1.45 | 1.50 | ..... |
| Middlebrook, Mo. | 3.00@3.50 | ..... | 2.00@2.25 | 2.00@2.25 | ..... | 1.25@3.00 |
| Richmond, Calif.—Quartzite | .75 | ..... | 1.00 | 1.00 | 1.00 | ..... |
| Rochester, N. Y. | | | Dolomite, all sizes, $1.50 per ton | | | |
| Somerset, Penn. (sand-rock) | | | 1.50 to 1.85 | | | |
| Toccoa, Ga.—Granite | .50 | 1.35 | 1.35 | 1.30 | 1.25 | 1.25 |

*¼ to ½ in. †¼ to 1 in. ‡¾ to 1¼ in. §¾ to 2¼ in. ¶Dust.
‖Rip rap per ton. (a) Sand. (b) to ⅛ in. (c) 1 in., 1.40. (d) 2in., 1.30. (h) Less 10c discount. (j) Less 10% net ton. (l) Less .05. (e) Agstone to June 15, 1927. [1] ¾ to ¼ in. [2] 1 to ¼ in. [3] 1½ to ¼ in. (A) Plus 4% sales tax, less 2% discount 30 days.

## Agricultural Limestone

**(Pulverized)**

| | |
|---|---|
| Alderson, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh | 1.50 |
| Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 90% thru 100 mesh | 4.50 |
| Atlas, Ky.—90% thru 100 mesh | 2.00 |
| 50% thru 100 mesh | 1.00 |
| Bettendorf and Moline, Ill.—Analysis, $CaCO_3$, 97%; 2% $MgCO_3$; 50% thru 100 mesh, 1.50; 50% thru 4 mesh | 1.50 |
| Blackwater, Mo.—100% thru 4 mesh | 1.00 |
| Branchton, Penn. — 100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh | 5.00 |
| Cape Girardeau, Mo.—Analysis, $CaCO_3$, 93½%; $MgCO_3$, 4½%; 50% thru 50 mesh | 1.50 |
| Cartersville, Ga.—50% thru 50-mesh | 1.50 |
| Charleston, W. Va.—Marl, per ton, bulk | 3.00 |
| Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk | 2.50 |
| Chico, Tex.—50% thru 50 mesh, 1.75; 50% thru 100 mesh | 2.25 |
| Colton, Calif.—Analysis, 90% $CaCO_3$, bulk | 4.00 |
| Cypress, Ill.—90% thru 100 mesh | 1.35 |
| Ft. Springs, W. Va.—50% thru 4 mesh | 1.50 |
| Hillsville, Penn.—Analysis, 94% $CaCO_3$; 1.40% $MgCO_3$; 75% thru 100 mesh; sacked | 5.00 |
| Hot Springs and Greensboro, N. C.—Analysis, $CaCO_3$, 98-99%; $MgCO_3$, 42%; pulverized; 67% thru 200 mesh; bags | 3.95 |
| Bulk | 2.70 |
| (Paving dust)—80% thru 200 mesh, bags | 4.25@ 4.75 |
| Bulk | 3.00@ 3.50 |
| Jamesville, N. Y. — Analysis 89% $CaCO_3$, 4% $MgCO_3$; pulverized; bags, 4.25; bulk | 2.75 |
| Joliet, Ill.—Analysis, 52% $CaCO_3$; 44% $MgCO_3$; 90% thru 100 mesh | 3.50 |
| Knoxville, Tenn.—80% thru 100 mesh; bags, 3.75; bulk | 2.50 |
| Ladds, Ga.—Analysis, $CaCO_3$, 64%; $MgCO_3$, 32%; pulverized; 50% thru 50 mesh | 1.50@ 2.75 |
| Marblehead, Ohio — Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.00; bulk | 3.50 |
| Marlbrook, Va.—Analysis, 80% $CaCO_3$; 10% $MgCO_3$; bulk, 1.75; bags | 3.75 |
| Marl—Analysis, 90% $CaCO_3$; 10% $MgCO_3$; bulk, 2:25; bags | 4.00 |
| Marion, Va. — Analysis, 90% $CaCO_3$, pulverized, per ton | 2.00 |
| Middlebury, Vt. — Analysis, 99.05% $CaCO_3$; 99% thru 20 mesh; bulk, 5.00; bags | 7.00 |
| Milltown, Ind. — Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk | 1.35@ 1.60 |
| Olive Hill, Ky.—90% thru 4 mesh | 1.00 |
| Piqua, Ohio—Total neutralizing power 95.3%; 99% thru 10, 60% thru 50; 50% thru 100 | 2.50@ 2.75 |
| 100% thru 10, 90% thru 50, 80% thru 100; bags, 5.10; bulk | 3.60 |
| 99% thru 100, 85% thru 200; bags, 7.00; bulk | 5.50 |
| Rocky Point, Va.—Analysis, $CaCO_3$, 95%; 50% thru 200 mesh, burlap bags, 3.50; paper, 3.25; bulk | 2.00 |
| Syracuse, N. Y. — Analysis 89% $CaCO_3$; $MgCO_3$, 4%; bags, 4.25; bulk | 2.75 |
| Toledo, Ohio—30% thru 50 mesh | 2.25 |
| Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; 50% thru 100 mesh; bags, 4.00; bulk | 2.50 |
| West Stockbridge, Mass. — Analysis, 90% $CaCO_3$, 50% thru 100 mesh; cloth bags, 4.75; paper, 4.25; bulk | 3.25 |
| Carload, 7.50; less than carload | 9.00 |

## Agricultural Limestone

**(Crushed)**

| | |
|---|---|
| Alton, Ill.—Analysis, 99% $CaCO_3$, 0.3% $MgCO_3$; 50% thru 4 mesh | 3.00 |
| Atlas, Ky.—90% thru 4 mesh | 1.00 |
| Bedford, Ind. — Analysis, 98.5% $CaCO_3$, 0.5% $MgCO_3$; 95% thru 10 mesh | 1.50 |

(Continued on next page)

## Agricultural Limestone

| | |
|---|---|
| Bridgeport and Chico, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh | 1.75 |
| 50% thru 4 mesh | 1.50 |
| Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh | .80 |
| Columbia, Krause, Valmeyer, Ill.—Analysis, 90% $CaCO_3$; 100% thru 4 mesh | 1.10@ 1.50 |
| Cypress, Ill.—90% thru 50 mesh, 50% thru 100 mesh, 90% thru 4 mesh, 50% thru 4 mesh | 1.35 |
| Danbury, Conn.—Analysis, 79% $CaCO_3$, 11% $MgCO_3$; 60% thru 100 mesh; 80% thru 50 mesh; 100% thru 4 mesh; bags, 4.25; bulk | 3.25 |
| Dundas, Ont.—Analysis, 54% $CaCO_3$; $MgCO_3$, 43%; 50% thru 50 mesh | 1.00 |
| Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh | 1.50 |
| Kansas City, Mo.—50% thru 100 mesh | 1.00 |
| Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh | 2.00 |
| Screenings (¼ in. to dust) | 1.00 |
| Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92¼ $MgCO_3$, 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk | 1.60 |
| Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 50% thru 50 mesh | 1.85@ 2.35 |
| McCook, Ill.—90% thru 4 mesh | .90 |
| Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind.—Analysis, 42% $CaCO_3$, 54% $MgCO_3$; meal, 100% thru 4 mesh; 20% thru 100 mesh | 1.50 |
| Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh | 1.50 |
| Mountville, Va.—Analysis, 62.54% $CaCO_3$; $MgCO_3$, 35.94%, 100% thru 20 mesh; 50% thru 100 mesh, bags | 5.00 |
| Pixley, Mo.—Analysis, 96% $CaCO_3$; 50% thru 50 mesh | 1.25 |
| 50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh | 1.65 |
| River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk | .80@ 1.40 |
| Stone City, Iowa—Analysis, 98% $CaCO_3$; 50% thru 50 mesh | .75 |
| Tulsa, Okla.—Analysis $CaCO_3$, 86.15%, 1.25% $MgCO_3$, all sizes | 1.25 |
| Waukesha, Wis.—90% thru 100 mesh, 4.50; 50% thru 100 mesh, 2.30; 90% thru 50 mesh | 1.75 |

## Pulverized Limestone for Coal Operators

| | |
|---|---|
| Hillsville, Penn., sacks, 4.50; bulk | 3.00 |
| Joliet, Ill.—Analysis, 55% $CaCO_3$; 45% $MgCO_3$; 95% thru 100 mesh; bulk | 3.50 |
| Piqua, Ohio, sacks, 4.50@5.00; bulk | 3.00@ 3.50 |
| Rocky Point, Va.—92% thru 100, mesh, bulk | 2.25@ 3.50 |
| Waukesha, Wis.—90% thru 100 mesh, bulk | 4.50 |

*Bags extra.

## Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

| | |
|---|---|
| Buffalo, N. Y. | 2.00@ 2.50 |
| Cedarville and S. Vineland, N. J.—Damp | 1.75 |
| Dry | 2.25 |
| Estill Springs and Sewanee, Tenn. | 1.50 |
| Franklin, Penn. | 2.25 |
| Gray Summit and Klondike, Mo. | 1.75@ 2.00 |
| Klondike, Mo. | 2.00 |
| Los Angeles, Calif.—Washed | 5.00 |
| Mendota, Va. | 2.25@ 2.50 |
| Michigan City, Ind. | .35 |
| Mineral Ridge and Ohlton, Ohio | 2.50 |
| Oceanside, Calif. | 3.00 |
| Ohlton, Ohio | 2.50 |
| Pittsburgh, Penn. | 3.00@ 4.00 |
| Red Wing, Minn. | 1.50 |
| Ridgway, Penn. | 2.50 |
| Rockwood, Mich. | 2.75@ 3.25 |
| Round Top, Md. | 2.00 |
| San Francisco, Calif. | 4.00@ 5.00 |
| Silica, Va. | 2.50 |
| St. Louis, Mo. | 2.00 |
| Sewanee, Tenn. | 1.50 |
| Thayers, Penn. | 2.50 |
| Zanesville, Ohio | 2.50 |

## Miscellaneous Sands

| City or shipping point | Roofing sand | Traction |
|---|---|---|
| Beach City, Ohio | | 1.75 |
| Columbus, Ohio | | .15@ .30 |
| Dresden, Ohio | | 1.00@ 1.25 |
| Eau Claire, Wis. | 4.25 | .40@ 1.00 |

(Continued on next page)

# Wholesale Prices of Sand and Gravel

**Prices given are per ton, F.O.B., producing plant or nearest shipping point**

## Washed Sand and Gravel

| City or shipping point | Fine Sand, 1/10 in. down | Sand, ¼ in. and less | Gravel, ½ in. and less | Gravel, 1 in. and less | Gravel, 1½ in. and less | Gravel, 2 in. and less |
|---|---|---|---|---|---|---|
| **EASTERN:** | | | | | | |
| Ambridge & So. H'g'ts, Penn. | 1.25 | 1.25 | 1.15 | .85 | .85 | .85 |
| Attica and Franklinville, N. Y. | .65 | .65 | .65 | .65 | .65 | .65 |
| Boston, Mass.‡ | 1.40 | 1.40 | 2.25 | | 2.25 | 2.25 |
| Buffalo, N. Y. | 1.10 | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 |
| Erie, Penn. | | 1.00* | | 1.50* | 1.75* | |
| Leeds Junction, Me. | | .50 | 1.75 | | 1.25 | 1.00c |
| Machias Jct., N. Y. | .75 | .75 | .85 | .75 | .75 | .75 |
| Montoursville, Penn. | 1.00 | 1.00 | .75 | .75 | .60 | .60 |
| Northern New Jersey | .50 | .50 | 1.00@1.25 | 1.00@1.25 | 1.00@1.25 | |
| Portland, Me. | | 1.00 | 2.25 | | 2.00 | |
| Shining Point, Penn. | | | 1.00 | 1.00 | 1.00 | 1.00 |
| Somerset, Penn. | | 2.00 | | | | |
| South Heights, Penn. | 1.25 | 1.25 | .85 | .85 | .85 | .85 |
| Washington, D. C. | .85 | .85 | 1.70 | 1.50 | 1.30 | 1.30 |
| **CENTRAL:** | | | | | | |
| Aurora, Yorkville, Sheridan, Oregon, Moronts, Ill. | .50 | .40 | .20 | .45 | .60 | .55 |
| Algonquin and Beloit, Wis. | .50 | .40 | .60 | .60 | .60 | .60 |
| Appleton and Mankato, Minn. | | .45 | 1.25 | 1.25 | 1.25 | 1.25 |
| Attica, Ind. | | | All sizes .75@.85 | | | |
| Barton, Wis. | | .50 | .75 | .75 | .75 | .75 |
| Chicago district, Ill. | .70 | .55 | .55 | .60 | .60 | .60 |
| Columbus, Ohio | | .75 | | .75 | .75 | |
| Des Moines, Iowa | | .30 | 1.30 | 1.30 | 1.30 | 1.40 |
| Eau Claire, Wis. | .40 | .40 | .60@ .80 | .90 | .90 | |
| Elkhart Lake, Wis. | .60 | .40 | .50 | .56 | .50 | .45 |
| Ferrysburg, Mich. | | .50@ .80 | .60@1.00 | .60@1.00 | | .50@1.25 |
| Ft. Dodge, Iowa | .85 | .85 | 2.05 | 2.05 | 2.05 | 2.05 |
| Grand Haven, Mich. | | .60@ .80 | .70@ .90 | .70@ .90 | | .70@ .90 |
| Grand Rapids, Mich. | | .50 | | .80 | .80 | .70 |
| Hamilton, Ohio | | 1.00 | | | 1.00 | |
| Hersey, Mich. | | .50 | | | | .70 |
| Humboldt, Iowa | .50 | .50 | 1.50 | 1.50 | 1.50 | 1.50 |
| Indianapolis, Ind. | .60 | .60 | | .90 | .75@1.00 | .75@1.00 |
| Joliet, Plainfield and Hammond, Ill. | .60 | .50 | .50 | .60 | .60 | .60 |
| Mason City, Iowa | .50@ .60 | .50@ .60 | 1.30 | 1.30 | 1.20 | 1.20 |
| Mankato, Minn. | | | | 1.25 | 1.25 | 1.25 |
| Mattoon, Ill. | | | .75@.85 all sizes | | | |
| Milwaukee, Wis. | .96 | .91 | 1.06 | 1.06 | 1.06 | 1.06 |
| Moline, Ill. | .60@ .85 | .60@ .85 | 1.00@1.20 | 1.00@1.20 | 1.00@1.20 | 1.00@1.20 |
| Northern New Jersey | .40@ .50 | .40@ .50 | 1.40 | 1.35 | 1.25 | |
| Pittsburgh, Penn. | 1.25 | 1.25 | .85 | .85 | .85 | .85 |
| Silverwood, Ind. | .75 | .75 | .75 | .75 | .75 | .75 |
| St. Louis, Mo. | 1.20 | 1.45 | 1.55a | 1.45 | 1.45 | 1.45 |
| Terre Haute, Ind. | .75 | .60 | .90 | .80 | .75 | .75 |
| Wolcottville, Ind. | .75 | .75 | .75 | .75 | .75 | .75 |
| Waukesha, Wis. | | .45 | .60 | .60 | .65 | .65 |
| Winona, Minn. | .40 | .40 | 1.50 | 1.25 | 1.15 | 1.10 |
| Zanesville, Ohio | | .60 | .50 | .60 | .80 | |
| **SOUTHERN:** | | | | | | |
| Charleston, W. Va. | 1.40 | 1.40 | 1.40 | 1.40 | 1.40 | 1.40 |
| Brewster, Fla. | .45 | .45 | 2.25 | | | |
| Brookhaven, Miss. | 1.25 | .70 | 1.25 | 1.00 | .70 | .70 |
| Chattahoochie River, Fla. | | .70 | | 1.75 | | |
| Eustis, Fla. | | .50 | | | | |
| Ft. Worth, Texas | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Knoxville, Tenn. | 1.00 | 1.00 | 1.20 | 1.20 | 1.20 | 1.20 |
| Macon, Ga. | | .50 | | | .90 | |
| New Martinsville, W. Va. | 1.00 | .90@1.00 | | 1.20@1.30 | | .80@ .90 |
| Roseland, La. | .35 | .35 | 1.25 | 1.00 | .65 | .65 |
| **WESTERN:** | | | | | | |
| Kansas City, Mo. | | .70 | | | | |
| Los Angeles, Calif. | .40 | .40 | .25@1.00 | .25@1.00 | .25@1.00 | .25@1.00 |
| Oregon City, Ore. | 1.25* | 1.25* | 1.25* | 1.25* | 1.25* | 1.25* |
| Phoenix, Ariz. | 1.25 | 1.00 | 2.00 | 1.50 | 1.75 | 1.00 |
| Pueblo, Colo. | .80 | .60 | | 1.20 | | 1.15 |
| San Diego, Calif. | | .40@ .50 | .80@1.00 | .80@1.00 | .65@ .80 | .65@ .80 |
| Seattle, Wash. (bunkers) | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |

## Bank Run Sand and Gravel

| City or shipping point | Fine Sand, 1/10 in. down | Sand, ¼ in. and less | Gravel, ½ in. and less | Gravel, 1 in. and less | Gravel, 1½ in. and less | Gravel, 2 in. and less |
|---|---|---|---|---|---|---|
| Algonquin and Beloit, Wis. | | | Dust to 3 in., .40 | | | .60 |
| Brookhaven, Miss. | | | | | | |
| Burnside, Conn. | .75 | | | | | |
| Des Moines, Iowa | .50 | | | | | |
| Ferrysburg, Mich. | | | | | | .65@1.00 |
| East Hartford, Conn. | .75* | | | | | |
| Gainesville, Texas | 1.15 | | | | | .55 |
| Grand Rapids, Mich. | | | | .50 | | |
| Hamilton, Ohio | | | | | 1.00 | |
| Hersey, Mich. | | | | .50 | | |
| Indianapolis, Ind. | | | Mixed gravel for concrete work, at .65 | | | |
| Lindsay, Texas | | 1.10 | | | .55 | |
| Macon, Ga. | .35 | | | | | |
| Mankato, Minn. | .30 | | | | | |
| Moline, Ill. (b) | .60 | .60 | Concrete gravel, 50% G., 50% S., 1.00 | | | |
| Oregon City, Ore. | 1.25* | 1.25* | 1.25* | 1.25* | 1.25* | 1.25* |
| Ottawa, Oregon, Moronts and Yorkville, Ill. | | | Ave. .60 per ton all sizes | | | |
| Roseland, La. | | | | | .50 | |
| Somerset, Penn. | | 1.85@2.00 | | 1.50@1.75 | | |
| St. Louis, Mo. | | | Mine run gravel, 1.55 per ton | | | |
| Summit Grove, Ind. | .50 | .50 | .50 | .50 | .50 | .54 |
| Winona, Minn. | .60 | .60 | .60 | .60 | .60 | .60 |
| York, Penn. | 1.10 | 1.00 | | | | |

*Cubic yd. ‡Delivered on job by truck. (a) 5/6-in. down. (b) River run. (c) 2½-in. and less. ¶By truck only.

## Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

| City or shipping point | Molding, fine | Molding, coarse | Molding, brass | Core | Furnace lining | Sand blast | Stone sawing |
|---|---|---|---|---|---|---|---|
| Aetna, Ill. | | | | .30@ .35 | | | |
| Albany, N. Y. | | 2.00 | 2.00 | 2.25 | 1.50 | 1.50 | 3.50 |
| Arenzville, Ill. | 1.50@1.75 | | | 1.00 | | | |
| Beach City, Ohio | 1.75 | 1.75 | | 1.75 | 1.75@2.00 | | |
| Buffalo, N. Y. | 1.50 | 1.50 | | 2.00@2.50 | | | |
| Columbus, Ohio | 1.50@2.00 | 1.25@1.50 | 2.00 | .30 | 1.75@2.00 | 2.75@4.50 | |
| Dresden, Ohio | 1.50@1.75 | 1.25@1.50 | 1.50@1.75 | 1.00@1.25 | | | |
| Eau Claire & Chippewa Falls, Wis. | | | | | | 3.00 | |
| Elco, Ill. | Ground silica per ton in carloads—18.00@31.00 | | | | | | |
| Estill Springs and Sewanee, Tenn. | 1.25 | | | 1.25 | | 1.35@1.50 | |
| Franklin, Penn. | 1.75 | 1.75 | | 1.75 | | | |
| Kasota, Minn. | | | | | | | 1.25 |
| Klondike, Mo. | | | | 2.00 | 2.00 | | 2.00 |
| Massillon, O. (a) | 2.00@2.25 | | | | 2.00@3.00 | | |
| Mendota, Va. | Ground flint or silex—16.00@20.00 per ton | | | | | | |
| Michigan City, Ind. | | | | .30@ .35 | | | |
| Millville, N. J. | | | | 1.75b | | 3.50 | |
| Montoursville, Penn. | | | | 1.35@1.50 | | | |
| New Lexington, O. | 2.00 | 1.25 | | | | | |
| Ohlton, Ohio | 1.75b | 1.75b | | 2.00b | 1.75b | 1.75b | |
| Red Wing, Minn.(d) | | | | | 1.50 | 3.00 | 1.50 |
| Ridgway, Penn. | 1.50 | 1.50 | 1.75@2.00c | | | | |
| Round Top, Md. | | | | 1.60 | | 2.25 | |
| San Francisco, Calif.[1] | 3.50† | 5.00† | | 3.50† 3.50@5.00† | 3.50@5.00† | 3.50@5.00† | |
| Silica, Va. | Potters' flint per ton, 9.00@10.00 | | | | | | |
| Thayers, Penn. | 1.25 | 1.25 | | 2.00 | | | |
| Utica, Ill. | .55 | .65 | | .60 | .75 | | |
| Utica, Penn. | 1.75 | 1.75 | | 2.00 | | | |
| Warwick, Ohio | 1.75*@2.00 | 1.75*@2.00 | | *1.50 | 1.75*@2.00 | 1.75*@2.00 | |
| Zanesville, Ohio | 2.00 | 1.50 | 2.00 | 2.50 | | 2.50 | |

*Green. †Fresh water washed, steam dried. [1]Core, washed and dried, 2.50. (b) Damp. (c) Shipped from Albany. (g) Dry. (a) Green, 1.50@1.75. (d) Filter sand, 3.00.

## Crushed Slag

| City or shipping point | Roofing | ¼ in. down | ½ in. and less | ¾ in. and less | 1½ in. and less | 2½ in. and less | 3 in. and larger |
|---|---|---|---|---|---|---|---|
| **EASTERN:** | | | | | | | |
| Buffalo, N. Y., Erie and Dubois, Pa. | 2.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Eastern Penn. | 2.50 | 1.20 | 1.50 | 1.20 | 1.20 | 1.20 | 1.20 |
| Northern N. J. | 2.50 | 1.20 | 1.50 | 1.20 | 1.20 | 1.20 | 1.20 |
| Reading, Penn. | 2.50 | 1.25 | | 1.25 | | | |
| Western Penn. | 2.50 | 1.25 | 1.50 | 1.25 | 1.25 | 1.25 | 1.25 |
| **CENTRAL:** | | | | | | | |
| Ironton, Ohio | 2.05* | 1.30* | 1.80* | 1.45* | | 1.45* | |
| Jackson, Ohio | | 1.05* | | 1.30* | 1.30* | 1.30* | |
| Toledo, Ohio | 1.50 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Youngst'n, O., dist. | 2.00 | 1.25 | 1.35 | 1.35 | 1.25 | 1.25 | 1.25 |
| **SOUTHERN:** | | | | | | | |
| Ashland, Ky. | | 1.45* | | 1.45* | 1.45* | 1.45* | |
| Ensley and Alabama City, Ala. | 2.05 | .80 | 1.35 | 1.25 | .90 | .90 | .80 |
| Longdale, Roanoke, Ruesens, Va. | 2.50 | 1.00 | 1.25 | 1.25 | 1.25 | 1.15 | 1.15 |
| Woodward, Ala. | 2.05* | .80* | 1.35* | 1.25* | .90* | .90* | |

*5c per ton discount on terms.

## Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

| | Finishing hydrate | Masons' hydrate | Agricultural hydrate | Chemical hydrate | Ground burnt lime, Blk. | Ground burnt lime, Bags | Lump lime, Blk. | Lump lime, Bbl. |
|---|---|---|---|---|---|---|---|---|
| **EASTERN:** | | | | | | | | |
| Berkeley, R. I. | | | 12.00 | | | | | 2.00 |
| Buffalo, N. Y. | | 12.00 | 12.00 | 12.00 | | | 10.00 | 1.95[4] |
| Chazy, N. Y. | | 8.50 | 7.50 | 10.00 | | 15.50[28] | 8.50 | 14.00 |
| Lime Ridge, Penn. | | | | | | | 5.00[2] | |
| Pittsburgh, Penn. | 12.50 | 8.50 | 8.50 | | 9.00 | 11.00 | 8.00 | |
| West Stockbridge, Mass. | 12.00 | 10.00 | 5.60 | | | | | 2.00[32] |
| Williamsport, Penn. | | | 10.00 | | | | 6.00 | |
| York, Penn. | | 9.50 | 9.50 | 10.50 | 8.50 | 10.50 | 8.50 | 1.65[7] |
| **CENTRAL:** | | | | | | | | |
| Afton, Mich. | | | | | | | 8.40 | 1.35 |
| Carey, Ohio | 12.50 | 8.50 | 8.50 | | 9.00 | | 8.50 | |
| Cold Springs, Ohio | | 8.50 | 8.50 | | | | 8.00 | |
| Cold Springs and Gibsonburg, Ohio | 12.50 | 8.50 | 8.50 | | 9.00 | 11.00 | | |
| Huntington, Ind. | 12.50 | 8.50 | 8.50 | | 9.00 | | 8.00 | |
| Luckey, Ohio | 12.50 | | | | | | | |
| Milltown, Ind. | | 8.50@10.00 | | 10.00[9] | | | 8.50[22] | 1.35[10] |
| Scioto & Marble Cliff, O. | | 8.50 | 8.50 | 9.50 | 8.25 | .62½ | 7.50 | 1.50[3] |
| Sheboygan, Wis. | 11.50 | | | | | | 9.50 | .95 |
| Wisconsin points[6] | | 11.50 | | | | | 9.50 | |
| Woodville, Ohio | 12.50 | 8.50 | 8.50 | | 9.00 | | 9.00 | 1.50[3] |
| **SOUTHERN:** | | | | | | | | |
| Allgood, Ala. | 12.50 | 10.00 | | | 8.50 | | 8.50 | 1.50 |
| El Paso, Texas | | | | | | | 7.00 | 1.50 |
| Frederick, Md. | | 9.50 | 9.00 | 9.50 | | 9.00 | 7.00 | |
| Graystone, Ala. | 12.50 | 9.00 | | 12.50 | | | 8.00 | 1.35 |
| Keystone, Ala. | 12.50 | 10.00 | 9.00 | 10.00 | 8.50 | | 8.00 | 1.50 |
| Knoxville, Tenn. | 20.25 | 9.00 | 9.00 | 9.00 | | | 8.00 | 1.35 |
| New Braunfels, Tex. | 18.00 | 12.00 | 10.00 | 12.00 | 10.00 | | 9.50 | |
| Ocala, Fla. | | 11.00 | 10.00 | | | | 11.00 | 1.60 |
| Saginaw, Ala. | 12.50 | 10.00 | 9.00 | 10.00 | | | 8.50 | 1.50 |
| **WESTERN:** | | | | | | | | |
| Kirtland, N. M. | | | | | | | 15.00 | |
| Limestone, Wash. | 15.00 | 15.00 | 10.00 | 15.00 | 16.50 | 16.50 | 16.50 | 2.09 |
| Los Angeles, Calif. | 19.00 | 19.00 | 14.00 | | 16.20 | | 12.50 | 2.50 |
| Dittlinger, Tex. | | 12.00@13.00 | | | | | 9.50[8] | 1.50[23] |
| San Francisco, Calif. | 20.00 | 20.00 | 13.50 | 21.00 | | | 14.50[30] | 2.15 |
| Tehachapi, Calif. | 12.80 | | | | | | 12.80 | |
| Seattle, Wash. | 19.00 | 19.00 | 12.00 | 19.00 | 19.00 | | 18.60 | 2.30 |

[2] Net ton. [3] Wooden, steel 1.70. [4] Steel. [5] Per 180-lb. barrel. [6] Dealers' prices, net 30 days less 25c disc. per ton on hydrated lime and 5c per bbl. on lump if paid in 10 days. [7] 180-lb. net barrel, 1.65; 280-lb. net barrel, 2.65. [8] To 11.00. [10] To 1.50. [15] To 3.00. [22] To 9.00. [23] To 1.60. [28] Barrels. [30] F.o.b. Woodville. [30] To 16.50.

## Miscellaneous Sands

(Continued)

| City or shipping point | Roofing Sand | Traction |
|---|---|---|
| Estill Springs and Sewanee, Tenn. | 1.35@ 1.50 | 1.35@ 1.50 |
| Michigan City, Ind. | | .30 |
| Mineral Ridge, Ohio | *1.75 | *1.75 |
| Montoursville, Penn. | | 1.10 |
| Ohlton, Ohio | a1.75 | a1.60 |
| Red Wing, Minn. | | 1.00 |
| Round Top, Md. | 2.25 | 1.75 |
| San Francisco, Calif. | 3.50 | 3.50 |
| Thayers, Penn. | | 2.25 |
| Warwick, Ohio | | 2.00 |
| Zanesville, Ohio | | 2.50 |

*Wet. (a) Green.

## Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

| | |
|---|---|
| Baltimore, Md.: | |
| Crude talc (mine run) | 3.00@ 4.00 |
| Ground talc (20-50 mesh), bags | 10.00 |
| Cubes | 55.00 |
| Blanks (per lb.) | .08 |
| Pencils and steel worker's crayons | .08 |
| Per gross | 1.00@ 1.50 |
| Chatsworth, Ga.: | |
| Crude talc, grinding | 5.00 |
| Ground talc (150-200 mesh) | 8.00@10.00 |
| Pencils and steel worker's crayons, per gross | 1.00@ 2.00 |
| Chester, Vt.: | |
| Ground talc (150-200 mesh), bulk | 9.00@10.00 |
| Including bags | 10.00@11.00 |
| Chicago and Joliet, Ill.: | |
| Ground (150-200 mesh), bags | 30.00 |
| Dalton, Ga.: | |
| Crude talc (for grinding) | 5.00 |
| Ground talc (150-200 mesh), bags | 12.00 |
| Pencils and steel worker's crayons, per gross | 1.00@ 2.50 |
| Emeryville, N. Y.: | |
| (Double air floated) including bags; | |
| 325 mesh | 14.75 |
| 200 mesh | 13.75 |
| Hailesboro, N. Y.: | |
| Ground white talc (double and triple air floated) 200-lb. bags, 300-350-mesh | 15.50@20.00 |
| Henry, Va.: | |
| Crude (mine run) | 2.50@ 4.00 |
| Ground talc (150-200 mesh), bags | 8.50@14.75 |
| Joliet, Ill.: | |
| Ground talc (20-50 mesh), bags | 12.00 |
| Illinois talc, bags | 12.00 |
| California talc, bags | 30.00 |
| Southern talc, bags | 20.00 |
| Pencils and steel worker's crayons, per gross | 2.50 |
| Keeler, Calif.: | |
| Ground (200-300 mesh), bags | 20.00@30.00 |
| Natural Bridge, N. Y.: | |
| Ground talc (125-200 mesh), bags | 10.00@15.00 |

## Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

| | |
|---|---|
| **Lump Rock** | |
| Columbia, Tenn.—B.P.L. 65-70% | 3.50@ 4.50 |
| Gordonsburg, Tenn.—B.P.L. 65-70% | 3.75@ 4.50 |
| Mt. Pleasant, Tenn.—B.P.L. 72% | 5.50 |
| Tennessee — F.o.b. mines, gross ton, unground brown rock, B.P.L. 72% | 5.00 |
| B.P.L. 75% | 6.00 |
| Twomey, Tenn.—B.P.L. 65%, 2000 lb. | 8.00@ 9.00 |
| **Ground Rock** (2000 lb.) | |
| Centerville, Tenn.—B.P.L. 65% | 8.00 |
| Gordonsburg, Tenn.—B.P.L. 65-70% | 4.00@ 4.50 |
| Mt. Pleasant, Tenn.—B.P.L. 72% | 5.00@ 5.50 |
| Twomey, Tenn.—B.P.L. 65% | 8.00@ 9.00 |

## Florida Phosphate

**(Raw Land Pebble)**

(Per Ton)

| | |
|---|---|
| Florida — F.o.b mines, gross ton, 68/66% B.P.L., Basis 68% | 3.25 |
| 70% min. B.P.L., Basis 70% | 3.75 |

## Mica

Prices given are net, f.o.b. plant or nearest shipping point.

| | |
|---|---|
| Pringle, S. D.—Mine run, per ton | 125.00 |
| Punch mica, per lb. | .06 |
| Scrap, per ton, carloads | 20.00 |
| Rumney Depot, N. H.—Per ton, | |
| Mine run | 360.00 |
| Clean shop scrap | 25.00 |
| Mine scrap | 22.00 |
| Roofing mica | 30.00 |
| Punch mica, per lb. | .12 |
| Cut mica—50% from Standard List. | |

## Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

| City or shipping point | Terrazzo | Stucco-chips |
|---|---|---|
| Barton, Wis., f.o.b. cars | ..... | 10.50 |
| Brandon, Vt. — English pink, English cream and coral pink | *12.50 | *12.50 |
| Brandon grey | *12.50 | *12.50 |
| Brighton, Tenn.— All colors and sizes | ..... | §5.00 |
| Buckingham, Que.—Buff stucco dash | ..... | 12.00@14.00 |
| Chicago, Ill. — Stucco chips, in sacks, f.o.b. quarries | ..... | 17.50 |
| Crown Point, N. Y.— Mica spar | ..... | 9.00@10.00 |
| Dayton, Ohio | ..... | 6.00@24.00 |
| Easton, Penn.— Green stucco | ..... | 12.00@18.00 |
| Green granite | ..... | 14.00@20.00 |
| Haddam, Conn.—Felstone buff | 15.00 | 15.00 |
| Harrisonburg, Va.—Bulk marble (crushed, in bags) | †12.50 | †12.50 |
| Ingomar, Ohio—Concrete facings and stucco dash | ..... | 6.00@24.00 |
| Middlebrook, Mo.—Red | ..... | 20.00@25.00 |
| Middlebury, Vt.—Middlebury white | ‡9.00 | ‡9.00 |
| Middlebury and Brandon, Vt.—Caststone, per ton, including bags | ..... | 5.50@ 7.50 |
| Milwaukee, Wis. | ..... | 14.00@34.00 |
| New York, N. Y.—Red and yellow Verona | ..... | 32.00 |
| Phillipsburg, N. J.— Royal green granite | ..... | 12.00@16.00 |
| Randville, Mich.¶— Crystalite crushed white marble, bulk | 5.00@ 7.50 | 4.50@ 7.50 |
| Stockton, Calif.—"Natrock" roofing grits | ..... | 12.00@16.00 |
| Tuckahoe, N. Y.—Tuckahoe white | 12.00 | ..... |
| Wauwatosa, Wis. | ..... | 20.00@25.00 |
| Wellsville, Colo. — Colorado Travertine Stone | 15.00 | 15.00 |

*Carloads, including bags: L.C.L. 14.50. †C.L. L.C.L. 17.00. ¶F.O.B. cars. ‡Carloads, including bags; L.C.L. 10.00. §Bulk, car lots, minimum 30 tons.

## Potash Feldspar

| | |
|---|---|
| Auburn and Topsham, Me. — Color white, 98% thru 140-mesh | 19.00 |
| Bristol, Tenn.—Color, white; analysis, $K_2O$, 6 to 10%; $Na_2O$, 2½ to 4%; $SiO_2$, 68 to 78%; $Fe_2O_3$, 12 to 20%; $Al_2O_3$, 16.5 to 18.5%; 99% thru 200 mesh; bulk, depending on grade | 14.50@18.00 |
| Brunswick, Me.—Color, white; 98% thru 140 mesh, bulk | 19.00 |
| Buckingham, Que.—Color, white, analysis, $K_2O$, 12-13%; $Na_2O$, 1.75%; bulk | 9.00 |
| De Kalb Jct., N. Y.—Color, white, bulk (crude) | 9.00 |
| East Hartford, Conn.—Color, white, 95% thru 60 mesh, bags | 16.00 |
| 96% thru 150 mesh, bags | 28.00 |
| East Liverpool, Ohio—Color, white; 98% thru 200 mesh, bulk | 19.35 |
| Soda feldspar, crude, bulk, per ton | 22.00 |
| Glen Tay Station, Ont.—Color, red or pink; analysis, $K_2O$, 12.81%; crude (bulk) | 7.00 |
| Keystone, S. D.—Prime white; bulk (crude) | 8.00 |
| Los Angeles, Calif.—Color, white; analysis, $K_2O$, 12.16%; $Na_2O$, 1.53%; $SiO_2$, 65.60%; $Fe_2O_3$, .10%; $Al_2O_3$, 10.20%; crude | 10.05 |
| Pulverized, 95% thru 200 mesh; bags, 22.00; bulk | 20.00 |
| Murphysboro, Ill.—Color, prime white; analysis, $K_2O$, 12.60%; $Na_2O$, 2.35%; $SiO_2$, 63%; $Fe_2O_3$, .06%; $Al_2O_3$, 18 20%; 98% thru 200 mesh; bags, 21.00; bulk | 20.00 |
| Penland, N. C.—Color, white; crude, bulk | 8.00 |
| Ground, bulk | 16.50 |
| Tenn. Mills—Color, white; analysis $K_2O$, 18%; $Na_2O_3$, 10%; 68% $SiO_2$; 99% thru 200 mesh; bulk | 18.00 |
| 99% thru 140 mesh, bulk | 16.00 |
| Toronto, Can.—Color, flesh; analysis $K_2O$, 12.75%; $Na_2O$, 1.96%; crude | 7.50@ 8.00 |

## Chicken Grits

| | |
|---|---|
| Afton, Mich.(Limestone), per ton | 1.75 |
| Belfast and Rockland, Me.—(Limestone), bags, per ton | ‡10.00 |
| Brandon and Middlebury, Vt.—Per ton | 10.00 |
| Cartersville, Ga.—(Limestone), per bag | 2.00 |
| Centerville, Iowa—(Gypsum), per ton | 18.00 |
| Chico, Texas — (Limestone), 100-lb. bags, per ton | 8.00@ 9.00 |
| Danbury, Conn.—(Limestone), bulk | 6.00@ 7.00 |
| Easton, Penn.—Per ton, bulk | 3.00 |
| Joliet, Ill.—(Limestone), bags, per ton | 4.50 |
| Knoxville, Tenn.—Per bag | 1.25 |
| Los Angeles, Calif.—(Feldspar), per ton | 15.00 |
| Gypsum, Ohio—(Gypsum), per ton | 10.00 |
| Limestone, Wash. — (Limestone), per ton | 12.50 |
| Marion, Va.—(Limestone), bulk, 5.00; bagged, 6.50; 100-lb. bag | .50 |
| Rocky Point, Va.—(Limestone), 100-lb. bags, 50c; sacks, per ton, 6.00; bulk | 5.00 |
| Seattle, Wash.—(Limestone), bulk, per ton | 10.00 |
| Warren, N. H.—(Mica), per ton | 3.85@ 3.90 |
| Waukesha, Wis.—(Limestone), per ton | 8.00 |
| West Stockbridge, Mass.—(Limestone), bulk | ‡7.50@*9.00 |
| Wisconsin Points—(Limestone), per ton | 9.00 |

*L.C.L. †Less than 5-ton lots. ‡C.L.

## Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

| | |
|---|---|
| Albany, Ga. | 12.00 |
| Anaheim, Calif. | 10.50@11.00 |
| Barton, Wis. | 10.50@13.00 |
| Boston, Mass. | 17.00* |
| Brighton, N. Y. | 19.75* |
| Brownstone, Penn. | 11.00 |
| Dayton, Ohio | 12.50@13.50 |
| Detroit, Mich. | 16.00 |
| Farmington, Conn. | 13.00 |
| Flint, Mich. | ¶12.00@17.50* |
| Grand Rapids, Mich. | 12.50 |
| Hartford, Conn. | 16.00@19.00* |
| Jackson, Mich. | 12.25 |
| Lakeland, Fla. | 10.00@11.00 |
| Lake Helen, Fla. | 9.00@12.00 |
| Lancaster, N. Y. | 12.25 |
| Madison, Wis. | 12.50a |
| Michigan City, Ind. | 11.00 |
| Milwaukee, Wis. | 13.00* |
| Minneapolis and St. Paul, Minn. | 10.00 |
| Minnesota Transfer | 10.00 |
| New Brighton, Minn. | 10.00 |
| Pontiac, Mich. | 14.50@17.00 |
| Portage, Wis. | 16.00 |
| Prairie du Chien, Wis. | 18.00@22.50 |
| Rochester, N. Y. | 19.75* |
| Saginaw, Mich. | 13.50 |
| San Antonio, Texas | 16.00 |
| Sebewaing, Mich. | 12.00 |
| Sioux Falls, S. Dak. | 13.00 |
| South River, N. J. | 14.00 |
| Syracuse, N. Y. | 18.00@20.00 |
| Toronto, Canada | 12.50@16.00† |
| Wilkinson, Fla. | 12.00@16.00 |
| Winnipeg, Canada | 14.00 |

*Delivered on job. †City delivery. ¶Dealers' price. (a) Less 50c discount per M., 10 days.

## Portland Cement

Prices per bag and per bbl., without bags, net in carload lots.

| | Per Bag | Per Bbl. |
|---|---|---|
| Albuquerque, N. M. | .86¾ | 3.47 |
| Atlanta, Ga. | ..... | 2.35 |
| Baltimore, Md. | ..... | 2.25 |
| Birmingham, Ala. | ..... | 2.30 |
| Boston, Mass. | .53¼ | 2.13 |
| Buffalo, N. Y. | ..... | 2.30 |
| Butte, Mont. | .90¼ | 3.61 |
| Cedar Rapids, Iowa | ..... | 2.24 |
| Charleston, S. C. | ..... | 2.35 |
| Cheyenne, Wyo. | .82¾ | 3.31 |
| Cincinnati, Ohio | .58 | 2.32 |
| Cleveland, Ohio | ..... | 2.24 |
| Chicago, Ill. | .51¼ | 2.05 |
| Columbus, Ohio | .57¼ | 2.29 |
| Concrete, Wash. | ..... | 2.35 |
| Dallas, Texas | ..... | 2.00 |
| Davenport, Calif. | ..... | 2.45* |
| Davenport, Iowa | ..... | 2.24 |
| Dayton, Ohio | .58¼ | 2.33 |
| Denver, Colo. | .66¼ | 2.65 |
| Des Moines, Iowa | ..... | 2.05 |
| Detroit, Mich. | ..... | 1.95@2.15 |
| Duluth, Minn. | ..... | 2.04 |
| Houston, Texas | ..... | 2.00 |
| Indianapolis, Ind. | .54¼ | 2.19 |
| Jackson, Miss. | ..... | 2.30 |
| Jacksonville, Fla. | ..... | 2.20 |
| Jersey City, N. J. | ..... | 2.13 |
| Kansas City, Mo. | ..... | 1.92 |
| Los Angeles, Calif. | .57½ | 2.50 |
| Louisville, Ky. | .55½ | 2.22 |
| Memphis, Tenn. | ..... | 2.30 |
| Milwaukee, Wis. | ..... | 2.00@2.20 |
| Minneapolis, Minn. | ..... | 2.12@2.22 |
| Montreal, Que. | ..... | 1.86 |
| New Orleans, La. | ..... | 2.20 |
| New York, N. Y. | ..... | 2.03 |
| Norfolk, Va. | ..... | 2.07 |
| Oklahoma City, Okla. | ..... | 2.46 |
| Omaha, Neb. | ..... | 2.36 |
| Peoria, Ill. | ..... | 2.22 |
| Philadelphia, Penn. | ..... | 2.21 |
| Phoenix, Ariz. | .81½ | 3.26 |
| Pittsburgh, Penn. | ..... | 2.04 |
| Portland, Colo. | ..... | 2.80 |
| Portland, Ore. | ..... | 2.60 |
| Reno, Nev. | ..... | 2.91 |
| Richmond, Va. | ..... | 2.34 |
| Salt Lake City, Utah | .70¼ | 2.81 |
| San Francisco, Calif. | ..... | 2.21 |
| Savannah, Ga. | ..... | 2.50 |
| St. Louis, Mo. | .51¼ | 2.05 |
| St. Paul, Minn. | ..... | 2.12@2.22 |
| Seattle, Wash. | ..... | 2.50 |
| Tampa, Fla. | ..... | 2.25 |
| Toledo, Ohio | ..... | 2.20 |
| Topeka, Kan. | ..... | 2.41 |
| Tulsa, Okla. | ..... | 2.33 |
| Wheeling, W. Va. | ..... | 2.12 |
| Winston-Salem, N. C. | ..... | 2.59 |

NOTE—Add 40c per bbl. for bags.

*Includes sacks.

Mill prices f.o.b. in carload lots, without bags, to contractors.

| | Per Bag | Per Bbl. |
|---|---|---|
| Albany, N. Y. | .43¾ | 1.75 |
| Buffington, Ind. | ..... | 1.80 |
| Chattanooga, Tenn. | ..... | 2.45* |
| Concrete, Wash. | ..... | 2.35 |
| Davenport, Calif. | ..... | 2.35 |
| Detroit, Mich. | ..... | 2.15 |
| Hannibal, Mo. | ..... | 1.90 |
| Hudson, N. Y. | ..... | 1.65 |
| Leeds, Ala. | ..... | 1.85 |
| Mildred, Kan. | ..... | 2.35 |
| Nazareth, Penn. | ..... | 2.15 |
| Northampton, Penn. | ..... | 1.75 |
| Richard City, Tenn. | ..... | 2.05 |
| Steelton, Minn. | ..... | 1.85 |
| Toledo, Ohio | ..... | 2.20 |
| Universal, Penn. | ..... | 1.80 |

*Including sacks at 10c each.

## Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

| | Crushed Rock | Ground Gypsum | Agricultural Gypsum | Stucco Calcined Gypsum | Cement and Gauging Plaster | Wood Fiber | White Gauging | Sanded Plaster | Keene's Cement | Trowel Finish | —Plaster Board— ¼x32x 36". Wt. 1500 lb. Per M Sq. Ft. | —Plaster Board— ⅜x32x 36". Wt. 1850 lb. Per M Sq. Ft. | Wallboard, ⅜x32 or 48". Lgths 6'-10'. 1850 lb. Per M Sq. Ft. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arden, Nev., and Los Angeles, Calif. | 3.00 | 8.00u | 8.00u | 10.70u | 10.70u | ..... | ..... | ..... | ..... | 11.70u | ..... | ..... | ..... |
| Centerville, Iowa | 3.00 | 10.00 | 15.00 | 10.00 | 10.00 | 10.50 | 13.50 | ..... | ..... | 13.50 | ..... | ..... | ..... |
| Des Moines, Iowa | 3.00 | 8.00 | 9.00 | 10.00 | 10.00 | 10.50 | 13.50 | 12.00 | 24.00 | 22.00 | 18.00 | 21.00 | 30.00 |
| Detroit, Mich. | ..... | ..... | ..... | ..... | 14.30o | 12.30m | ..... | m9.00@11.00o | ..... | ..... | ..... | ..... | ..... |
| Delawanna, N. J. | ..... | ..... | ..... | ..... | ..... | 8.00 | ..... | 9.00 | ..... | ..... | .14½ | .15½ | 30.00 |
| Douglas, Ariz. | ..... | ..... | 6.00 | ..... | ..... | ..... | 15.00 | ..... | 40.00 | 13.50 | 35.00 | 45.00 | ..... |
| Grand Rapids, Mich. | 2.75 | 6.00 | 6.00 | 8.00 | 9.00 | 9.00 | 17.50 | ..... | 24.55 | 20.00 | ..... | ..... | ..... |
| Gypsum, Ohio | 3.00 | 4.00 | 6.00 | 8.00 | 9.00 | 9.00 | 19.00 | 7.00 | 27.50 | 19.00 | ..... | 15.00 | 30.00 |
| Los Angeles, Calif. | ..... | ..... | 7.50@9.50 | 11.50y | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Port Clinton, Ohio | 3.00 | 4.00 | 6.00 | 10.00 | 9.00 | 9.00 | 21.00 | 7.00 | 30.15 | 20.00 | ..... | 20.00 | 30.00 |
| Portland, Colo. | ..... | ..... | ..... | 10.00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| San Francisco, Calif. | ..... | ..... | 11.65m | 13.40r | 14.40r | ..... | 15.40r | ..... | ..... | ..... | ..... | ..... | ..... |
| Seattle, Wash. | ..... | ..... | 10.50 | 13.00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Sigurd, Utah | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 21.50 | ..... | ..... | ..... | ..... |
| Winnipeg, Man. | 5.00 | 5.00 | 7.00 | 13.00 | 14.00 | 14.00 | ..... | ..... | ..... | ..... | 20.00 | 25.00 | 33.00 |

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable).
(m) Includes paper bags; (o) includes jute sacks; (r) including sacks at 15c; (u) includes sacks; (y) sacks 15c extra, rebated.

# Market Prices of Cement Products

## Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point

| City or shipping point | Sizes 8x8x16 | 8x10x16 | 8x12x16 |
|---|---|---|---|
| Camden, N. J. | 17.00 | | |
| Cement City, Mich. | | 5x8x12—55.00¶ | |
| Columbus, Ohio | 17.00c@19.00a | | |
| Detroit, Mich. | .16 | | .18 |
| Forest Park, Ill. | 21.00* | | |
| Grand Rapids, Mich. | 15.00@16.00a | | |
| Graettinger, Iowa | .18@ .20 | | |
| Indianapolis, Ind | .13@ .15† | | |
| Los Angeles, Calif.¶ | 5¾x3½x12—55.00 | 7¾x3½x12—65.00 | |
| Oak Park, Ill. | 16.00@18.00 | | |
| Olivia and Mankato, Minn. | 9.50b | | |
| Somerset, Penn. | .20@ .25 | | |
| Tiskilwa, Ill. | .16@ .18† | | |
| Yakima, Wash. | 20.00* | | |

*Price per 100 at plant. †Rock or panel face. (a) Face. ‡Delivered. ¶Price per 1000. (b) Per ton. (c) Plain.

## Cement Roofing Tile

Prices are net per sq. in. carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.

| | |
|---|---|
| Red | 15.00 |
| Green | 18.00 |
| Chicago, Ill.—Per sq. | 20.00 |

Cicero, Ill.—Hawthorne roofing tile, per sq.

| | Chocolate, Red, Yellow, Gray, and Orange | Green, Blue |
|---|---|---|
| French and Spanish† | $11.50 | $13.50 |
| Ridges (each) | .25 | .35 |
| Hips | .25 | .35 |
| Hip starters | .50 | .60 |
| Hip terminals, 2-way | 1.25 | 1.50 |
| Hip terminals, 4-way | 4.00 | 5.00 |
| Mansard terminals | 2.50 | 3.00 |
| Gable finials | 1.25 | 1.50 |
| Gable starters | .25 | .35 |
| Gable finishers | .25 | .35 |
| *End bands | .25 | .35 |
| *Eave closers | .06 | .08 |
| *Ridge closers | .05 | .06 |

*Used only with Spanish tile.
†Price per square.

Houston, Texas—Roofing Tile, per sq. 25.00

Indianapolis, Ind.—9x15-in. Per sq.

| | |
|---|---|
| Gray | 10.00 |
| Red | 11.00 |
| Green | 13.00 |

Waco, Texas: Per sq.

| | |
|---|---|
| 4x4 | .60 |

## Cement Building Tile

| | |
|---|---|
| Cement City, Mich.: | Per 100 |
| 5x8x12 | 5.00 |
| Grand Rapids, Mich.: | |
| 5x8x12 | 8.00 |
| 5x4x12 | 4.50 |
| Longview, Wash.: (Stone-Tile) | Per 1000 |
| 4x6x12 | 55.00 |
| 4x8x12 | 64.00 |
| Mt. Pleasant, N. Y.: | Per 1000 |
| 5x8x12 | 78.00 |
| Grand Rapids, Mich.: | Per 100 |
| 5x8x12 | 7.00 |
| Houston, Texas: | |
| 5x8x12 (Lightweight) | 80.00 |
| Pasadena, Calif. (Stone Tile): | Per 100 |
| 3½x4x12 | 3.00 |
| 3½x6x12 | 4.00 |
| 3½x8x12 | 5.50 |
| Tiskilwa, Ill.: | Per 100 |
| 8x8 | 15.00 |
| Wildasin Spur, Los Angeles, Calif. (Stone-Tile): | Per 1000 |
| 3½x6x12 | 50.00 |
| 3½x8x12 | 60.00 |
| Prairie du Chien, Wis.: | |
| 5x8x12 | 82.00 |
| 5x4x12 | 46.00 |
| 5x8x 6 (half-tile) | 41.00 |
| 5x8x10 (fractional) | 82.00 |
| Yakima, Wash. (Building Tile): | |
| 5x8x12 | .10 |

## Cement Drain Tile

| | |
|---|---|
| Graettinger, Iowa—5 to 36 in., per ton | 8.00 |
| Olivia and Mankato, Minn.—Cement drain tile, per ton | 8.00 |
| Tacoma, Wash.—Drain tile, per ft.: | |
| 3 in. | .04 |
| 4 in. | .05 |
| 6 in. | .07½ |
| 8 in. | .10 |
| Waukesha, Wis.—Drain tile, per ton | 8.00 |

## Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

| | Common | Face |
|---|---|---|
| Appleton, Minn. | 22.00 | 25.00@40.00 |
| Baltimore, Md. (Del. according to quantity) | 15.50 | 22.00@50.00 |
| Camden and Trenton, N. J. | 17.00 | |
| Ensley, Ala. ("Slagtex") | 14.50 | 22.50@33.50 |
| Eugene, Ore. | 25.00 | 35.00@75.00 |
| Forest Park, Ill. | | 37.00 |
| Friesland, Wis. | 22.00 | 32.00 |
| Longview, Wash.* | 15.00 | 22.50@65.00 |
| Milwaukee, Wis. | 14.00 | 20.00@45.00 |
| Mt. Pleasant, N. Y. | | 14.00@23.00 |
| Oak Park, Ill. | | 37.00@42.00 |
| Omaha, Neb. | 18.00 | 30.00@ 40.00 |
| Pasadena, Calif. | 10.00 | |
| Philadelphia, Penn. | 14.75 | 20.00 |
| Portland, Ore. | 17.50 | 23.00@55.00 |
| Mantel brick—100.00@150.00 | | |
| Prairie du Chien, Wis. | 14.00 | 22.50@ 25.00 |
| Rapid City, S. D. | 18.00 | 25.00@40.00 |
| Waco, Texas | 16.50 | 32.50@125.00 |
| Watertown, N. Y. | 20.00 | 35.00 |
| Westmoreland Wharves, Penn. | 14.75 | 20.00 |
| Winnipeg, Man. | 14.00 | 22.00 |
| Yakima, Wash. | 22.50 | |

*40% off List.

## Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted.

| Culvert and Sewer | 4 in. | 6 in. | 8 in. | 10 in. | 12 in. | 15 in. | 18 in. | 20 in. | 22 in. | 24 in. | 27 in. | 30 in. | 36 in. | 42 in. | 48 in. | 54 in. | 60 in. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detroit, Mich. | | | | | | | | 15.00 per ton | | | | | | | | | |
| Graettinger, Iowa | .04½d | .05½ | .08½ | .12½ | .17½ | ..... | .40 | .50 | .60 | .70 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Grand Rapids, Mich. (b) | | | | | | | | | | | | | | | | | |
| Culvert pipe | ..... | ..... | ..... | .60 | .72 | 1.00 | 1.28 | 1.60† | ..... | 1.92 | 2.32 | 3.00 | 4.00 | 5.00 | 6.00 | ..... | ..... |
| Sewer pipe (d) | ..... | ..... | ..... | ..... | ..... | .63 | ..... | .60† | ..... | ..... | ..... | .58 | ..... | ..... | ..... | ..... | ..... |
| Houston, Texas | ..... | .19 | .28 | .43 | .55½ | .90 | 1.30 | ..... | 1.70† | 2.20 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Indianapolis, Ind. (a) | ..... | ..... | ..... | .80 | .90 | 1.10 | 1.30 | ..... | ..... | 1.70 | ..... | 2.70 | ..... | ..... | ..... | ..... | ..... |
| Longview, Wash. | | | | | | | | Sewer pipe 40% off list; culvert—list | | | | | | | | | |
| Mankato, Minn. (b) | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1.50 | 1.75 | 2.50 | 3.25 | 4.25 | ..... | ..... | ..... |
| Newark, N. J. | | | | | | | | 6 in. to 24 in., $18.00 per ton | | | | | | | | | |
| Norfolk, Neb. (b) | ..... | ..... | ..... | .90 | 1.00 | 1.13 | 1.42 | ..... | ..... | 2.11 | ..... | 2.75 | 3.58 | ..... | 6.14 | ..... | 7.78 |
| Olivia, Mankato, Minn. | | | | | | | | 12.00 per ton | | | | | | | | | |
| Paullina, Iowa‡ | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 2.25 | ..... | 2.11 | ..... | 2.75 | 3.58 | ..... | 6.14 | ..... | 7.78 |
| Somerset, Penn. | ..... | ..... | ..... | ..... | 1.08 | 1.25 | 1.65 | ..... | ..... | 2.50 | ..... | 3.65 | 4.85 | 7.50 | 8.50 | ..... | ..... |
| Tacoma, Wash. | .15 | .18 | .22½ | .30 | .40 | .55 | .75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Tiskilwa, Ill. (rein.) (a) | ..... | ..... | ..... | .65 | .75 | .85 | 1.10 | 1.60 | ..... | 1.90 | ..... | 2.25 | 3.40 | ..... | 5.50 | ..... | ..... |
| Wahoo, Neb. (b) | ..... | ..... | ..... | ..... | 1.00 | 1.13 | 1.42 | ..... | ..... | 2.11 | ..... | 2.75 | 3.58 | 4.62 | 6.14 | 6.96 | 7.78 |
| Yakima, Wash. | | | | | | | | $10.00 per ton | | | | | | | | | |

(a) 24-in. lengths; (b) Reinforced; (d) Eastern clay, list, 72% and 60% off.
†21-in. diam. ‡Price per 2-ft. length.

## Alabama Concrete Pipe Co. Completes New Plant

A NEW concrete pipe plant at Birmingham, Ala., has been recently completed by the Alabama Concrete Pipe Co., lately organized by Walter T. Weaver. The plant, located on a 6½-acre tract, is of permanent construction, representing an estimated cost of about $150,000. The buildings are of steel construction with corrugated iron siding.

The pipe manufacturing building is 60x100 ft. and contains a complete line of electrically operated McCracken concrete pipe-making machinery. There are seven curing kilns, five 20x100 ft. and the other two 20x60 ft. A large concrete mixer, conveying belts for handling materials from outside storage bins, and other equipment have been placed. Machinery for testing pipe will be installed within a short time.

Reinforced and plain pipe, of the bell and spigot or tongue-groove types, will be made for drainage, sewers and road culverts. The first machinery unit produces pipe from 4 to 30 in. in diameter. A little later, additional equipment will be installed so that pipe up to 60 in. can be made.

First deliveries of finished pipe are expected to be made early in September. A spur track of the A. B. & C. railroad will serve the plant.

Rush M. Hess, formerly manager of the Montgomery, Ala., plant of the Shearman Concrete Pipe Co., will handle the sales.

## New Edition of Metal Quarry Catalog

THE seventh annual issue of the Keystone Metal Quarry Catalog has been recently brought out by the McGraw-Hill Catalog and Directory Co., Inc., New York. The book of 642 pages has been divided into 24 sections, each devoted to different phases of engineering, maintenance and operation of the various quarry industries in the metallic and non-metallic fields.

New tables, reference data and engineering data have been compiled and placed conveniently near the sections showing advertisers' equipment catalogued in the book. The entire book is carefully indexed, alphabetically, both as to subjects and equipment. The price is $10.

## Why Belgian Cement Industry Is Prosperous

NOTWITHSTANDING the curtailment of imports of Belgian portland cement into the United States, through agitation of American cement manufacturers and building supply dealers, the Belgian portland cement industry is enjoying increasing prosperity. A recent United States *Commerce Reports* notes that:

"The Belgian cement industry is prosperous as a result of heavy local and foreign demands that are well above the production capacity of the plants, and prices show a distinct tendency upward. The local demand has been greatly stimulated by very satisfactory conditions in the Belgian tile, asbestos and cement industries. In connection with the recent broad program of road building and repair, producers are planning an active campaign for cement roads."

According to the public American Consular records in Belgium, thirteen shipments of cement were made to the United States in July, 1927, with a total of 116,737 bbl. This compares with 277,233 bbl. in July, 1926, a decrease of 160,496 bbl., or 58%.

For home consumption the present mill price is 175-180 francs, or 89-91 cents a barrel. Prices have not been cut because the trade is in such flourishing condition. There was a price increase on July 1 of 5 cents a barrel and another 5 cents a barrel is promised in the near future. The demand exceeds the capacity by 30%. The profits for the first six months of 1927 are said to be greater than for the entire year of 1926.

The price and destination of each of the thirteen shipments in July were as follows:

1—$1.82 per 4 bags c.i.f. Boston
2— 1.82 per 4 bags c.i.f. Boston
3— 1.90 per 4 bags c.i.f. Philadelphia
4— 1.90 per 4 bags c.i.f. Miami
5— 2.05 per 4 bags c.i.f. San Francisco
6— 2.04 per 4 bags c.i.f. Gray Harbor
7— 2.65 per 4 bags c.i.f. New York
8— 2.13 per 4 bags c.i.f. San Juan, P. R.
9— 3.25 per 4 bags c.i.f. Honolulu
10— 2.20 per 4 bags c.i.f. Honolulu
11— .816 f.o.b. Belgian mill
12— .88 f.o.b. Belgian mill
13— .926 f.o.b. Belgian mill

Prices to the United States range from 81 to 91 cents a barrel f.o.b. Belgian mill. At the same time the delivered price in Holland, including paper bags, was 94 cents.

Railroad rates in Belgium are today 15% lower than in 1913 and construction costs are about the pre-war level. The wages in the majority of the mills are at present 10.50 cents an hour.

*The Revue du Travail*, the official labor bulletin of the Belgian government, in its July issue, attributes the present market decline, as compared with last year, in shipments of cement to the United States as "the consequence of the campaign followed by the American cement mills against imported cements, the major part of which are of Belgian origin."

Official export statistics for June and for the first six months of 1927, just released by the Belgian government, show that Belgium's shipments of cement to all countries, January-June, 1927, were 22% greater than the same period in 1926. The total exports for June, 1927, were 42% greater than for June, 1926. Shipments to the United States, January-June, 1927, show a decline of 57% and shipments to the United States for June, 1927, show 81,873 bbl., against 104,944. The difference between figures of exports to the United States for June and those shown by the Bureau of Mines is probably due to exports through Belgian ports of cement not made in Belgium.

The statistics confirm the statement that the cement industry is at present flooded with foreign orders—that present demand exceeds capacity by 30%. They also suggest that the coming year will prove even more prosperous than last—the most prosperous in the history of the industry.

That Belgium ships in about equal volume to the United Kingdom, France, and Holland. That Germany, alone of the neighboring countries, with very high production costs, does not take any Belgian cement. The reason is to be found in the German tariff, which is prohibitive—43c a barrel, or 40% of the Belgian mill price. That shipments to the United States show a steady decline. Exports to that market for the first half of 1927 were 57% below 1926. Shipments in June, 1927, were 23% less than the same month in 1926.

Exports for the first six months of 1927, with those for the same period in 1926 in parentheses:

| | | |
|---|---|---|
| To all countries, in bbl. | 4,272,873 | (3,467,530) |
| United States | 522,819 | (1,060,944) |
| Holland | 916,031 | (876,436) |
| Great Britain | 906,031 | (329,543) |
| France | 915,414 | (307,543) |

The figures for June, 1927 (those for June, 1926, in parentheses), in bbl.:

| | | |
|---|---|---|
| All countries | 691,432 | (487,113) |
| Holland | 158,642 | (197,131) |
| United States | 81,873 | (104,944) |
| Great Britain | 157,909 | (50,457) |

The figures show that Belgium is scarcely holding her own in the price-war in Holland, where the German with domestic prices and production costs double those of the Belgians, are supplying the greater part of the demand. German dumping is more effective than Belgian low production costs.

## Rumor of Birmingham Cement Plant Not True

A STORY is current in southern papers to the effect that the Tennessee Coal and Iron Co. has begun work on a cement plant at Old Jonesboro, near Birmingham, Ala. Advices from an authoritative source are that there is no intention of building such a plant at the present time.

## William E. Carson Mentioned for Virginia's Governor

UNDER the caption "Governor's Race May Start Soon" a signed article by R. L. C. Barret, in the *Richmond* (Va.) *News-Leader* of August 9, starts out thus:

"When the state Democratic convention in Norfolk, in 1924, gave the lion's share of applause to Harry F. Byrd, it was considered an omen that the Winchester man would be the next governor. The next state convention will be held next year, probably in Richmond, and soon the various candidates, potential and otherwise, for the governorship and other state offices subject to election by the people, will be preparing to get in the convention's limelight.

"Rumors are being heard on the riviera that W. E. Carson, of Riverton, may be a candidate for governor on a platform to further carry out the Byrd policies. Mr. Carson is the chairman of the state commission on conservation and development. He is a progressive business man, and was manager of the Byrd campaign leading to the Democratic primary of 1925. He resides in the county of Warren and it will probably be urged against his candidacy that his home is too near that of Governor Byrd and that it is unusual to have a governor succeeded by a man from his own section."

Four other possibilities are mentioned. Looking back at the services rendered the American lime industry by William E. Carson, of Riverton, County of Winchester, State of Virginia, over many years, it is certain that many friends of Mr. Carson will hope that further reference to these other possibilities will be as "also ran."

## Diesel Tug Delivered to Goodwin-Gallagher

THE new Diesel tugboat *Betty*, built for the Goodwin-Gallagher Sand and Transportation Corporation, has been added to the huge fleet of harbor craft operating in New York Harbor. The tug made a non-stop run from the Fall River yards of the Crowninshield Shipbuilding Co. in the fast time of 16 hours, 30 minutes. J. J. and J. V. Gallagher declared that the vessel had exceeded their expectations on the run to New York.

The Betty is a wooden vessel 92 ft. long, with a beam of 21 ft. and a depth of nine feet, six inches. She is equipped with a 360 hp. Fairbanks-Morse Diesel, making the fourth vessel of the company's fleet of nine thus equipped.

Among those who made the initial trip on the Betty were J. Johnson, marine superintendent; H. Bade, engineer, and C. A. Stanley, purchasing agent for the Goodwin-Gallagher company; A. C. Dodge, manager, and T. W. Drennan, manager of the marine department, New York branch, and Major J. Breslin, of New York City.

# New Machinery and Equipment

## New Crawling Dragline

THE Page Engineering Co., Chicago, Ill., has just put on the market a new crawling dragline, Model 411-C, a larger capacity machine weighing approximately 65 tons. It was designed as a companion for the Page walking dragline, which is of the same capacity, having a two cu. yd. bucket on a 60-ft. boom.

The new machine is built so that it can be shipped in three compact units exclusive of the boom and the bucket. It can be loaded on a flat car under its own power, the size being within the limits required by railroads as to width, length and height. Its construction is such that assembly and unloading at its destination requires but two days, the manufacturers claim.

*New crawling dragline*

The propelling and steering mechanism are operations independent of each other or as the manufacturers say, the machine can be moved with the boom in any direction, even while swinging. Air controls are used on the machine.

The dragline is mounted upon four tractors built up on a structural frame. Each tractor is hinged in its center to allow vertical but not horizontal motion, thus enabling, it is said, the machine to travel over uneven ground. All four tractors are driven by a positive chain drive. Each tractor shoe is 33x13½ and is an alloy steel casting. The overall length of two tractors is 25 ft., the total bearing surface on each side is 33 in. x 23 ft. 4 in.

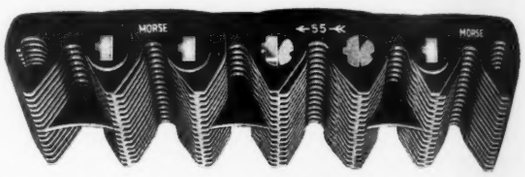
The machinery on the dragline crawler is identical with that used on the walking dragline built by the company. The power unit is a Model "B" Page-Huid Diesel engine, which is standard equipment for this machine.

*Ne wcrawling dragline operated by Diesel engine*

## Improved Type of Silent Chain Has New Joint

SEVERAL improvements in its original type of rocker-joint silent chain have bene incorporated in a new design, No. 55, according to the Morse Chain Co., the manufacturers. The operating principle remains the same, the new link running on all sprockets, its height and length being the same as the old. In the new joint, the seat pin has been enlarged to give greater bearing surface and also to make it a stronger transverse member. The contour of the rocker pin has been changed so as to give a better contact surface with the links, the manufacturers say.

The combined joint members are said to give a more nearly round hole with reduced clearance, thus holding the links more securely on the pins. A better balanced joint, heavier than the old, is said to produce a smoother running chain. The joint pins are about 8% heavier and the complete chain weighs twice the pitch per inch foot. The breaking strength is claimed to be increased.




*Improved silent chain*

## New Tension Sleeve Coupling for Changing Drives

THE Ajax Flexible Coupling Co., Westfield, N. Y., have recently developed a new tension sleeve coupling, through which, it is claimed, quick changes in hook-up are facilitated. This coupling is also said to permit one motor to drive different machines at different times. Connections and disconnections are made quickly, the manufacturers say, the only tools required being a pipe and set-screw wrench.

The coupling is made so that the flange attached to the driven shaft is readily removable. The removable half is made with an extended split hub on the driving flange, the hub being tapered on the outside and threaded over one half its length closest the flange. A collar made to fit over the threaded hub screws up to a tension fit, tightening the hub to the shaft, being further held in place by set screws fitted over two sliding keys.

*Details of new tension sleeve coupling*

The removable flange and collar are made of steel, all other parts being identical to standard Ajax couplings, and so interchangeable in case of accidental breakage.

Such a coupling should be of great advantage in changing a motor to a new machine.

## New Herringbone Speed Reducer

THREE standard units of the "Sykes" herringbone speed reducer, covering a wide range of ratios and capacities, are a recent development of the Link-Belt Co., Chicago, Ill. The single reduction unit designated as type "S" covers ratios up to 10 to 1. Types "D" and "DV" are double reduction units, type "D" being for heavy

*New herringbone type speed reducer*

duty with ratios from 10 to 1 up to 80 to 1. Type "DV" is a light duty reducer with ratio range from 10 to 1 up to 130 to 1.

The new unit is said to be simply constructed with a small number of parts. The pinions are of heat treated alloy steel cut integral with the shaft. The gears rotate within a large oil reservoir and the Timken bearings are splash lubricated. Special oil baffles at shaft projections are provided to keep dust out and oil in. The housing is free from oil grooves and oil wipers. The rigid construction is said to insure proper alignment of parts and the base plate furnished when required maintains alignment of the reducer and its motor.

## A Mill That Dries and Grinds

THE Raymond Bros. Impact Pulverizer Co. has brought out a combination of its well-known mill with a drying furnace by which the material is ground and dried at the same time. It is called the "Kiln-Mill" and the principal difference between it and the mill of the ordinary type is that a furnace is added to heat the air which is circulated through the mill and the main cyclone of the air separation device. Waste heat from other operations in any plant may be used instead of the furnace for heating the air.

The results of a test made at the works of the Sainte Genevieve Lime and Quarry Co., Sainte Genevieve, Mo., are published in one of the Raymond company's bulletins. The material to be ground was a high calcium limestone containing about 4% of moisture, and heat from an old rotary drier furnace was used in the mill. The fuel was coke and the gases entered the system at 500 to 600 deg. F. This heat dropped to 175 deg. F. when the gases mixed with the material and air used for separation. The outgoing gases carrying the moisture were discharged at 125 deg. F.

The limestone was pulverized to 99.6% through 200 mesh and the moisture reduced to 0.1%, it is claimed.

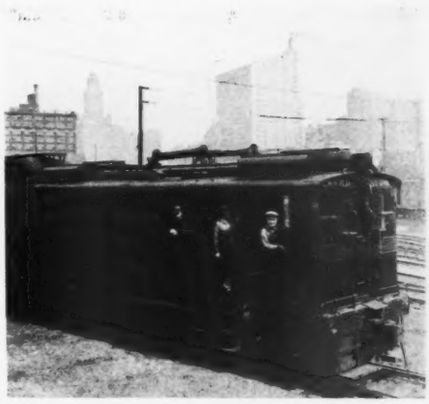
Before the mill was equipped for air drying it delivered 1700 to 1800 lb. of product per hour. After being turned into a "kiln-mill" it produced as high as 2400 lb. per hour. It also produced a better product in color and uniformity, the bulletin says.

## Increasing Use of Diesel-Electric Locomotives

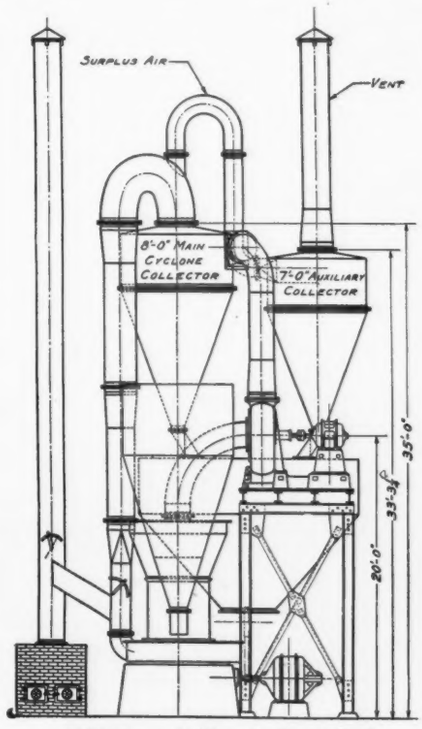
By C. H. VIVIAN

THE Chicago and Northwestern Railway has in service three oil-electric locomotives in its State street and North Pier yards —right in the heart of the city—where unnecessary noise and smoke are especially objectionable. The railroad has been able to abate an annoyance to neighboring businesses; has dispensed with locomotive smoke; has increased speed in car handling; and has added materially to safety in doing this indispensable work. In accomplishing these desirable ends, the Chicago and Northwestern Railway has, at the same time, been able to reduce substantially its operating costs for this service.

The locomotives in use were built jointly by the American Locomotive Co., the General Electric Co., and the Ingersoll-Rand Co. Power from a 300-hp. oil engine drives a generator which supplies current to motors mounted on the trucks and geared to the driving axles.



*New oil-electric locomotive*




*Mill for grinding in heated air*

## Hammer Crushers for Wet and Muddy Rock

AN article on this page in ROCK PRODUCTS, August 20, 1927, describing a new hammer-mill crusher for wet and muddy rock contained a comparison of this crusher with a similar type of crusher having a tractor feed. While the article in question made it perfectly clear to the reader that ROCK PRODUCTS was merely repeating claims made for the new crusher by its makers, it is only fair to the makers of the tractor-type feed crusher to quote the following from their letter:

"In our opinion there are several misstatements that are detrimental to us, due to the fact that a direct comparison is made to the tractor-feed type of crusher, which everybody knows, or should know, is a patented machine. The article states that the tractor type or link breaker plate 'often allows stone 2 and 3 in. to pass, even though set for ¾-in. crushing.' This is an unsupported statement, the truth or untruthfulness of which you are in a position to verify.

"We do not object to anyone referring to their product as being superior to anything on the market, but we do object to an article which bears the stamp of authority and sets forth misstatements such as are contained in this article."

Without attempting to pass on the mooted points in this controversy between these two types of crusher feeds, because, frankly, we do not know the merits of the claims on either side, the editors of ROCK PRODUCTS do acknowledge a temporary lapse of that *eternal editorial vigilance* which is necessary to give character to any journal. Above all things we desire to be fair and honorable in our treatment of every individual and every branch of the industries that we serve, and of course it is not fair to give currency to unsupported claims such as these, so we ask that our readers and manufacturer friends bear with us in an occasional error.

# News of All the Industry

## Incorporations

**Washington Floor and Stucco Co.**, Tacoma, Wash., $15,000. E. B. and Mamie Fish.

**River Feldspar Co.**, Middletown, Conn., $100,000. Arthur Postley, 34 Home Ave., Middletown.

**Northwestern Portland Cement Co.**, Seattle, Wash., decreased capital stock to $1,000,000.

**Reservation Sand and Gravel Corp.**, Irving, N. Y., $250,000, F. J. Knorr, Albany, N. Y.

**Wilbee Concrete Products Co.**, Jackson, Mich., increased capital stock from $15,000 to $30,000.

**Pacific Waterproof Stucco Co.**, Portland, Ore., $2,000. W. F. Roberts, O. F. Vetterli and others.

**Raymond Concrete Pile Co.**, Detroit, Mich., increased capital stock from $1,050,000 to $3,200,000.

**Rock Face Brick and Tile Co.**, Houston, Tex., $50,000. W. B. Boot, Dave Oliver, J. Dixie Smith.

**Tennesseee Cast Stone and Building Co.**, Kingsport, Tenn., $75,000; to manufacture concrete products.

**Milwood Sand Co.**, Howard, Ohio, $15,000. Theodore R. Marten, U. G. Lazarus, Elizabeth Lazarus.

**Glacier Gravel Co.**, Seattle, Wash., $100,000. Formerly State Gravel Co., Tacoma, Wash. (Tanner & Garvin.)

**Pueblo Cinder Block Co.**, Pueblo, Colo., 100,000 shares no par value. H. T. Ashley, A. A. Laad and E. N. Walters.

**Concrete Materials Corp.**, Lankershim, Calif., $120,000. Hugh W. Jones, Fred M. McAvoy and Anis McAvoy Hill.

**David Smith, Inc.**, Bloomfield, N. J., 500 shares; to manufacture cement products. (Peck & Davis, Bloomfield.)

**Marvelstone and Tile Co.**, Tulsa, Okla., $50,000. J. G. McAllister, D. L. Krakower and W. H. Blerley, all of Tulsa.

**Concrete Service Co.**, Birmingham, Ala., $10,000. Dewey H. Jones, 919 Alabama Ave., Frank H. Dooley and B. F. Jones.

**Bucklin Concrete Products Co., Inc.**, Miami, Fla., $10,000. Frederick J. Ward, Frank X. Schreiber and May K. Cullen.

**Austin Sand and Gravel Co.**, Birmingham, Ala., $10,000. C. W. Austin, First Natl. Bank Bldg., Birmingham, J. B. Marshall.

**Oklahoma Plaster Co.**, Oklahoma City, Okla., $10,000. John E. Taylor, 1919 W. 38th St., Chas. W. Parsons and M. E. Taylor.

**Commonwealth Portland Cement Corp.**, Wilmington, Del., 27,000 shares no par value. (New York-Delaware Registration Co.)

**Bowling Green Rock Asphalt Co.**, Philadelphia, Penn., $750,000; to deal in cement and rock asphalt. J. Vernon Pimm of Philadelphia.

**American Petrifite Co.**, Seattle, Wash., $99,990; to engage in sand, gravel and stone products business. W. A. Wilson and Ernest Walters.

**Weymouth Washed Sand and Gravel Co.**, Weymouth, Mass., 280 shares no par value. President, Thomas H. Hannaford; treasurer, Anthony L. Cassese, East Weymouth, and William A. Hannaford.

**New England Concrete Pipe Corp.**, Newton, Mass., $100,000 and 4,000 shares no par value common stock. Stuart G. Rutherford, John A. Burke. Henry C. Eames. 275 Tremont St., Boston; Chauncey W. Hood and William E. Byrne of Milford.

## Quarries

**El Dorado, Kan.**—The highway board of Butler county has purchased a portable rock crusher for use on county road work.

**Wagner Construction Co.**, Shelby, N. C., has received an order for $20,000 worth of crushed stone from its quarry at Shelby, from the town of Cherryville, N. C. The stone is to be used in the construction of a new municipal septic tank.

## Sand and Gravel

**Superior Gravel Co.**, Glidden, Texas, is erecting a new washing plant west of Glidden.

**Fort Worth and Denver Railroad** has opened a new gravel pit at Murdo, Texas, to supply ballast for their line between Murdo and Texline, Texas.

**A. D. Alderson**, Houston, Texas, is making arrangements to open a new gravel pit near Ramsey, Texas. This is one of the four pits Mr. Alderson is now opening in Texas.

**Ohio Sand and Gravel Producers Association** held its mid-year meeting at Cedar Point, Ohio, in August and reported building conditions about normal for the first part of the year.

**Lawrence Stone and Gravel Co.**, Raleigh, N. C., has opened an office in the Carolina Life Insurance building in Columbia, S. C. The office will do business in wholesale crushed granite and sand.

**Gary Sand Co.**, Griffith, Ind., has bought the Schaff pit at Griffith and is planning to rebuild the plant and start operation at once. The owners of the company are H. W. Lackey and C. E. O'Malley.

## Cement

**Universal Portland Cement Co.**, Buffington, Ind.—Twelve hundred members and friends of the Chicago chapter of the Western Society of Engineers recently made an inspection of the newly completed Buffington harbor of the Universal Portland Cement Co. and also of the plant itself. Major R. W. Putnam, chief engineer of the Harbor Plan of Chicago, and B. I. Affleck, president of the Universal Portland Cement, acted as hosts.

## Cement Products

**Valley Concrete Pipe and Products Co.**, Richmond, Calif., is about to erect a concrete warehouse on Meade avenue.

**A. R. Hensler** of Battle Creek, Mich., has recently installed an electric loader and screener at his cement building block plant.

**Seeing Concrete America.** Illustrated bulletin showing modern structural purposes to which concrete has been put. PORTLAND CEMENT ASSOCIATION, Chicago, Ill.

**New Pictures of Old Concrete Streets.** Booklet illustrating some of the older concrete pavements in the United States. PORTLAND CEMENT ASSOCIATION, Chicago, Ill.

**Austin Brick and Tile Co.**, Austin, Texas, of which E. D. Kennedy, 2023 East Fifth street, is general manager, is reported to be installing additional machinery to manufacture trim stone, building tile and brick.

**Urnite Manufacturing Co.**, Austin, Texas, has increased its capital stock to $30,000 and will open an additional plant. Max Werkenthin is president of the company, which manufactures "synthetic stone."

**Bent Concrete Pipe Co.**, Amarillo, Texas, is reported to be about to construct a new $25,000 plant at Amarillo, including an office building, warehouse, mixing plant, drying vats and other special machinery.

**Neal, Clayton and Fisher Co.**, St. Petersburg, Fla., is clearing ground for its new concrete block plant at 38th street and Lealman avenue, St. Petersburg. Machinery for the new plant has already been purchased.

## Gypsum

**George A. Duke**, representative of the Calacoustic Corporation of California, a subsidiary of the Standard Gypsum Co., Los Angeles, is in Portland, Ore., interviewing building contractors regarding the use of sound-absorbing plaster. A recent contract for "calacoustic" was for the plaster in the million-dollar Orpheum theater in Seattle, Wash.

## Miscellaneous Rock Products

**Universal Magnesite Co.**, Escanaba, Mich., is enlarging its plant, to take care of the growing business.

## Personals

**R. H. McGredy** has been appointed sales manager of the Lo-Hed hoist division of the American Engineering Co., Philadelphia.

**C. W. McDowell** is now representing the Longview Lime Works, Longview, Ala., in Birmingham, Ala. Mr. McDowell formerly was in the brick business in Birmingham.

**L. E. Wilson** has taken over the executive management of the Tennessee Sand and Gravel Co. Colonel Wilson has been connected with the material and supply department of the government at Panama.

## Obituaries

**Caesar A. Grasselli**, chairman of the board of the Grasselli Chemical Co. and one of the leading American chemical manufacturers, died in Cleveland on July 28, 1927, at the age of 76. For more than 30 years Mr. Grasselli served as president of the Grasselli company and under his leadership developed that organization to a leading position among producers of acids and heavy chemicals.

## Manufacturers

**The Universal Crusher Co.**, Cedar Rapids, Iowa, is building a $12,000 addition to its factory at 625 C Ave., W.

**Falk Corp.**, Milwaukee, Wis., announces the opening of an office in Portland, Ore., at 720 Terminal Sales building, 12th and Morrison streets, with John Jurgensen in charge.

**Allis-Chalmers Manufacturing Co.**, Milwaukee, Wis., recently forwarded some rush repair parts for mining machinery at Hurley, N. M., by air mail at a postage charge of $151.60.

**Harnischfeger Corp.**, Milwaukee, Wis., announce the opening of a new branch office at 524 Buder building, St. Louis, Mo., with L. J. DeHoney, sales engineer, to direct the work in the St. Louis territory.

**The Climax Engineering Co.**, Clinton, Iowa, announces the election of George W. Dulany, Jr., as chairman of the board of directors; Edward F. Deacon, president, to succeed Mr. Dulany, and W. E. Eberhart, Jr., treasurer.

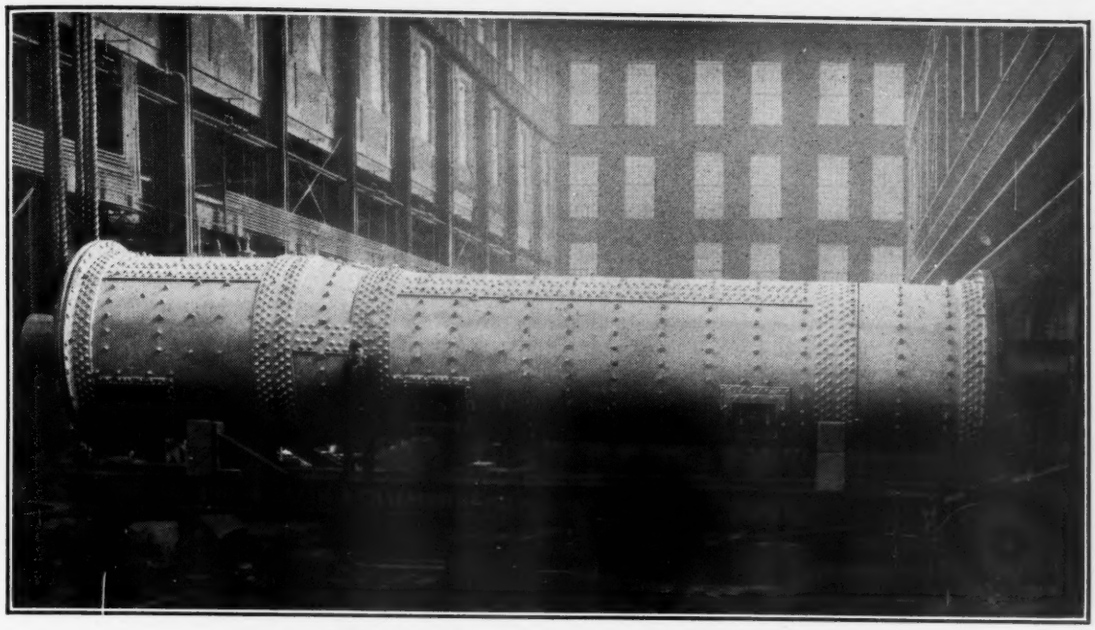
**Akron Barrow Co.** has changed its name to General Wheelbarrow Co., effective September 1. The company is one of the oldest manufacturers of wheelbarrows in the United States, having been continuously in business since 1840. Headquarters will remain as heretofore at 3140 East 65th street, Cleveland, Ohio.

**Young Radiator Co.**, Racine, Wis., has been organized with F. M. Young as president. The company will manufacture radiators for trucks, tractors, power units and various industrial uses. Mr. Young was formerly president and general manager of the Racine Radiator Co., Racine, Wis.

**Westinghouse Electric and Manufacturing Co.** announces that Sprout, Waldron & Co. of Muncy, Penn., have taken over all the patterns, equipment, etc., of the Valley Iron Works of Williamsport, Penn., and will now handle all Monarch transmission appliances, including a complete line of milling machinery equipped with Westinghouse motors and controllers.

**Westinghouse Electric and Manufacturing Co.** recently announced the winners of the 1927 War Memorial scholarships. The scholarships, established in memory of the Westinghouse employes who lost their lives in the World War, carry a fund of $500 a year and are good for a period of four years.

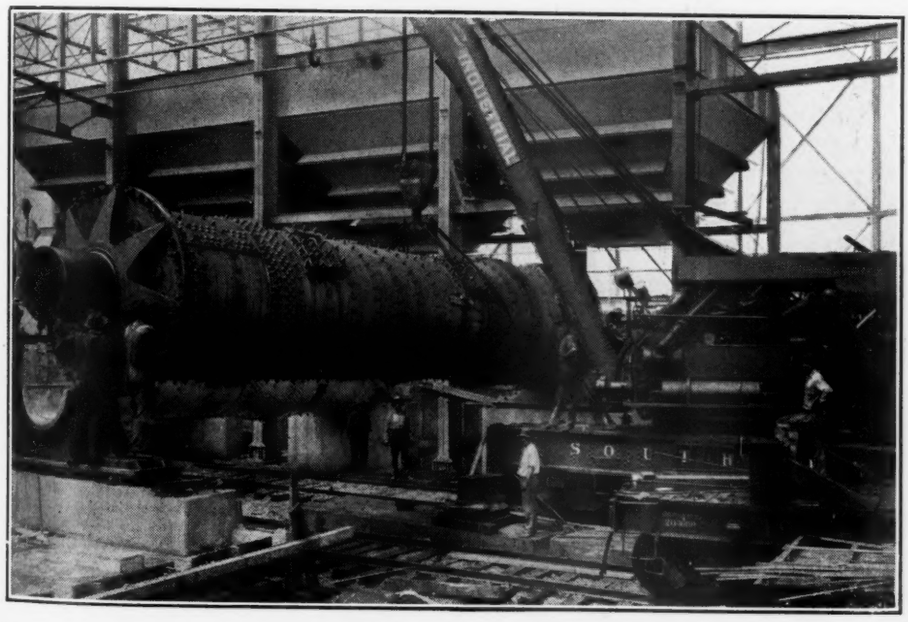
The winners in the 1927 contest were: H. L. Bunker, Jr., son of H. L. Bunker, rate setter, East Pittsburgh Works. Mr. Bunker will attend Carnegie Institute of Technology. P. J. Glaister, tester, East Pittsburgh works, who will attend Cornell University; M. T. Ayres, son of M. C.



No. 8740 Clinker Compeb Mill loaded on special car in our shop.

# Manufacturing Facilities *Only* Will Permit This

All Allis-Chalmers Compeb Mills for domestic shipment are assembled complete in our shops as represented by these photographs. All linings for interior of mill installed, shell linings being backed up with zinc. Heads attached. This method of shipment insures purchaser of accuracy and eliminates field expense of assembling.



No. 8740 Clinker Compeb Mill being unloaded from car and placed directly on foundations in customer's plant.

**ALLIS-CHALMERS**

**MILWAUKEE, WIS. U.S.A.**

*When writing advertisers, please mention ROCK PRODUCTS*

Ayres, foreman of dial markers, Newark works. Mr. Ayres will attend the Massachusetts Institute of Technology. A. L. Kine, the fourth winner, is the son of R. R. Kime, salesman, New York office. Mr. Kime will attend Princeton University.

**Atlas Conveyor Co.**, recently organized, has opened offices at 20 South 15th street, Philadelphia. Associated with this company will be Percival K. Reed, L. G. Weygandt and E. A. Thumlert, all of whom were formerly connected with the R. H. Beaumont Co. as chief engineer, eastern sales manager and general manager, respectively. The company will design and build material handling equipment suitable for the rock products industries.

**Northern Blower Co.**, Cleveland, Ohio, announces that it recently completed the installation of a "Norblo" dust collecting system for the Crucible Steel Casting Co., West 84th St., Cleveland, Ohio. This "Norblo" system operates in connection with Hummer screens and is used for reclaiming core sand. The Tavern Rock Sand Co.'s head office at Alton, Ill., has recently placed a contract for "Norblo" equipment of the new "dustless" type for its plant at Klondyke, Mo.

**Dorr Co.**, New York, announces the following appointments and changes: E. R. Ramsey, heretofore in charge of the metallurgical division of the company in Denver, Colo., has been appointed to the position of assistant general sales manager with headquarters in New York; A. D. Marriott, who has been assistant manager of the metallurgical division, will succeed Mr. Ramsey in charge of this division and will continue with headquarters in Denver; A. T. Hastings has been made assistant manager of the metallurgical division and, in addition to his new duties, will continue in charge of the Dorr Co.'s office in Los Angeles.

The company has also established a service department in New York City which will be in charge of H. A. Linch.

## Trade Literature

*NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention* ROCK PRODUCTS.

**Used Equipment.** Bulletin No. **339** listing compressors, boilers, industrial rolling stock, motors, etc., offered by ZELNICKER, St. Louis, Mo.

**"50 to 10,000 Gallons,"** direct mail circular describing the new **61-O Novo** Diaphragm Pumps. NOVO ENGINE CO., 241 Porter St., Lansing, Mich.

**Thew Center Drive.** Booklet explaining the center drive principle employed on Thew shovels and draglines. THE THEW SHOVEL CO., Lorain, Ohio.

**Safety Devices.** Reference book containing useful data on mechanical safeguards, first aid information, etc. L. F. GRAMMES AND SON, Allentown, Penn.

**Piston Rings.** Bulletin **P. L.-12** on Ever-Tyte piston rings for engine, pump or compressor cylinders. Price list, etc. WALTER A. ZELNIKER SUPPLY CO., St. Louis, Mo.

**A Modern Super-Power Plant.** Reprint of the "Lauderdale Steam Electric Station of the Florida Light and Power Co." COMBUSTION ENGINEERING CORP., New York.

**Collecting Fly-Ash and Coal Dust,** Bulletin No. **1028** on Sirocco type "D" collector. Diagrams, dimensions data, efficiency charts, etc. AMERICAN BLOWER CO., Detroit, Mich.

**2¼-Yard Electric Shovel,** bulletin describing and containing specifications and working ranges of the Type **490** Marion 2¼-yd. electric shovel. THE MARION STEAM SHOVEL CO., Marion, Ohio.

**High Powered Steam Auxiliary Station.** A description of the new 100,000-hp. Buck steam station of the Southern Power Co. near Salisbury, N. C. COMBUSTION ENGINEERING CORP., New York.

**Bottom Dump Trailers.** Broadside or bottom dump and platform trailers and power scrapers used with caterpillar, McCormick-Deering and Cletrac tractors. MIAMI TRAILER SCRAPER CO., Troy, Ohio.

**Earle Products,** a booklet giving descriptions, data and information on gears, pinions and speed reducers manufactured by the EARLE GEAR AND MACHINE CO., 4705-15 Stenton Ave., Philadelphia, Penn.

**Chains and Sprockets,** catalog No. **50,** giving dimensions, illustrations, specifications and installation data and price lists on all types of chains and sprockets manufactured by the WEBSTER MFG. CO., Chicago, Ill.

**Corduroy Craves.** Bulletin **43-X,** giving industrial applications, construction details and data on design of P. & H. machines. Capacity and clearance tables, illustrations, etc. HARNISCHFEGER CORP., Milwaukee, Wis.

**The Labor Saver,** No. **156,** containing descriptions, specifications, operating and installation data on **"JFS" Variable Speed Transmissions, "SA" Speeducers,** gears, etc. STEPHENS-ADAMSON MFG. CO., Aurora, Ill.

**Reintjes 'Flexible Corner Bonding and Fill Tile,** a circular describing and illustrating methods of setting Nos. **601** and **602** corner bonding and fill tiles manufactured by GEO. P. REINTJES CO., 2517-19 Jefferson St., Kansas City, Mo.

**Worthington Double-Acting Two-Cycle Diesel Engine,** Bulletin No. **S-173,** containing data and information on construction and installation. WORTHINGTON PUMP AND MACHINERY CORP., 115 Broadway, New York City.

**Bethlehem Diesel Engines,** catalog **F,** giving descriptions, data and specifications on the operation of Type **S** two-cycle airless injection type Diesel engines for stationary service. BETHLEHEM STEEL CO., Bethlehem, Penn.

**Crushing Rolls,** Bulletin No. **2106** on crushing rolls of standard and special types. Data on construction, design, selling dimensions, capacities, etc. Charts for determining capacities, engineering and installation details. TRAYLOR ENGINEERING AND MANUFACTURING CO., Allentown, Penn.

**Micarta Gears and Pinions,** circular No. **1579-E** containing data and technical information relative to the manufacture, design, form of construction, formula and tables based upon the recommended practice of the American Gear Manufacturers' Association for Micarta gears. WESTINGHOUSE ELECTRIC AND MANUFACTURING CO., East Pittsburgh, Penn.

**General Electric Bulletins,** No. **37A** on types **AD,RRB** and **RRC** Direct Heat Electric Furnaces; No. **80A** on types **CR7061-Q2,** low voltage and **CR7061-S2** high voltage, Automatic Reduced Voltage Starters for Synchronous Motors; No. **104 G-E** Cartridge Units; No. **164A,** on type **RP,** G-E Electrically Heated Metal Melting Pots; No. **578A** on Type **D** Mechanical Drive Turbines; No. **597A,** on Push and Pull-button Control Switches; No. **598** on G-E 2000 to 6000 Kw. Electric Turbines; No. **773** on types **CR7771** and CR7772 Duplex Controllers for A-c. Squirrel-cage motors driving pumps. GENERAL ELECTRIC COMPANY, Schenectady, N. **Y.**

## Resistance of Stone to Frost

EXPERIMENTS to determine the relative resistance of various types and deposits of stone to frost action are now being conducted, according to a statement of the U. S. Bureau of Standards.

The full text of the statement follows:

In this country there are few stone structures which are more than 100 years old. Considering the type of stone so extensively utilized at the present time, there are few structures built of them which have stood for a period greater than 50 years. While actual examples of stone structures which have stood for long periods are of the greatest value in estimating the durability of any particular stone, short periods of use have only a relative value in this respect.

In order to gain more knowledge of the desirability of present-day building stone, this bureau is conducting experiments to determine the relative resistance to frost action of various types and deposits. Frost action tests, when carried to the point where the specimens are disintegrated, with many deposits of natural stone, require a considerable expenditure of time, and hence an important object of this research is to determine, if possible, a more simple means of predicting durability.

A comparison of the frost resistance of many samples of stone with the usual physical determinations, such as strength, elasticity, porosity, absorption or relation of absorption and porosity, shows that while such properties may have a bearing on the subject of durability, they do not afford a thoroughly reliable criterion for judging this property.

A theory has been advanced that if a stone readily absorbs a volume of water greater than nine-tenths of its pore space it will not be resistant to frost action. This is based on the fact that water increases in volume by one-tenth in solidifying. The present research does not indicate that this theory is reliable. Considerable evidence has been developed that the relation of absorption to permeability is a valuable factor in predicting durability; that is, if the stone offers little resistance to the flow of water through its pores, a high absorption may not be particularly undesirable.

A technologic paper will be available at an early date containing the results of frost action tests on the limestones of this country. Work is in progress on the commercial sandstones.

## Hydraulic Society Standards

STANDARDS of the Hydraulic Society is now issued in a fourth edition. It is sold for the nominal price of 50c by the society, which has its offices at 90 West St., New York. C. H. Rohrbach is secretary.

The new edition is profusely illustrated with charts, tables, drawings and half-tones of pumps and pump parts. It contains sections on definitions and values; extracts from pump test codes; a revised pump classification; description of types, parts and definitions pertaining to the several classes of pumps (reciprocating displacement, rotary displacement, centrifugal, and deep-well); instructions for installing and operating each type; a recommended contract form for use in the pump industry; data, tables, curves and formula, including pipe friction data for both water and oil, and a comprehensive list of materials recommended for pumping different liquids.

## Equipment Manufacturers Merge

DIRECTORS of the Brown Hoisting Machinery Co., Cleveland, Ohio, and Industrial Works, Bay City, Mich., have approved plans for a merger of the two companies, to be made effective when ratified by their respective stockholders at meetings which will be held in the near future. The new concern will be known as the Industrial Brown Hoist Corp. A. C. Brown will head the new company, which will have combined resources of $13,000,000.

Both companies have occupied outstanding positions in the material handling equipment manufacturing industry for a number of years. The individual plants will be operated as before, the only change being in the concentration of that portion of work which can be produced to best advantage to either the Bay City or Cleveland plants.